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An Inquiry

INTO

PYLORIC STENOSIS OF INFANTS.

BY LEONARD G. PARSONS, M.D., M.R.C.P. LOND.,

HON. PHYSICIAN, BIRMINGHAM AND MIDLAND HOSPITAL FOR SICK CHILDREN; PHYSICIAN, INFANTS HOSPITAL; AND ASSISTANT PHYSICIAN, GENERAL HOSPITAL, BIRMINGHAM;

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INTRODUCTION.

THE objects of this paper are to examine critically the results of treatment of this condition in the authors' series of cases, and to give some results of attempts, still in progress, to investigate the nature of the disease and some of its symptoms. The statistics quoted will be from the authors' own cases and also from cases at the Birmingham and Midland Free Hospital for Sick Children.

There is no need to give the history of the discovery of this disease, but we would point out that although Hirschsprung, in 1888, first emphasised its clinical importance, it is to John Thomson and Still that the wide recognition of the disease is due. The surgical treatment in this country owes much to the work of Stiles, Burghard, Nicol, Dent, and recently to Tyrrell Gray, whose theory of "hyper-adrenalism" we criticise later on in this paper.

The symptoms are too well known to need discussion in detail; they can be concisely summed up as follows: Persistent and projectile vomiting, obstinate constipation, pronounced and progressive wasting in a nursling born healthy. We regard typical gastric peristalsis as characteristic of the disease, if it be accompanied by vomiting. A history only of vomiting is not always sufficient, even when peristalsis is present, for we have convinced ourselves that a very obvious and marked peristalsis of the characteristic slow type—i.e., three to four waves per minute—may occur without pyloric stenosis. One such case was admitted to hospital with a history of vomiting. On its admission vomiting did not occur, but there was very definite peristalsis of this type, and we, therefore, decided to operate upon it. An abdominal incision was made and when the pylorus was delivered it was seen to be normal and was returned to the abdomen; the abdomen was stitched up and the child made an uneventful recovery. Previous to this case we should have regarded peristalsis of this type as quite diagnostic of the disease. In spite of this error in diagnosis, we do not regard palpation of the pyloric tumour as essential. It can usually be felt, but the examination is often painful. As pointed out by Miller, palpation is usually only possible during the time of obvious peristalsis, because the stomach in diastole falls over and obscures the pylorus.

RADIOGRAPHIC INVESTIGATION.

Radiographic examination may be very useful as confirmatory evidence of a pyloric stenosis. We have had many of our cases radiographed, not primarily for the purpose of confirming the diagnosis, but to give some idea of the size of the stomach and as a means of investigation of the disease. The method used by Dr. C. G. Teall, the radiographer at the hospital, is to give a drachm of barium sulphate in a mixture of an ounce of milk and an ounce of water. The baby is spoon-fed, because it is found that there is thus less liability to vomit than if the mixture is given in the bottle. Cases have been radiographed before and after operation, and very striking differences have been observed. Variot [1] states that radiographic examination is the best single evidence of pyloric stenosis, and Strauss [2] also says that it is the most important means of making an actual exact diagnosis. The latter states it not only shows whether or no the case is one of pyloric stenosis, but decides for us immediately whether the patient is to receive medical or surgical treatment. We find we cannot agree with these dicta, because in the first place it is quite easy to make a diagnosis without an X ray examination, and in the second place X ray evidence of stasis, even of extreme stasis, is not certain evidence that pyloric stenosis exists. In a certain case which clinically was not a pyloric stenosis the X ray examination suggested that such stenosis was present, because in plates taken one or two hours after a meal nearly all the barium was retained in the stomach, very little having passed into the intestine. When this case came to autopsy the pylorus was found to be normal, thus agreeing with the other clinical signs. This appears to us conclusive evidence of the existence of pylorospasm, a fact which has been denied by many writers.

One of the advantages of Rammstedt's operation is that for a time it appears to eliminate a large part of the sphincter action of the pyloric musculature. For instance, in a case aged 11 weeks, before operation X ray examination showed very deep waves of peristalsis, all the food was in the stomach one hour after the meal, and after two hours two-thirds of the meal was in the stomach. Three weeks later, after Rammstedt's operation had been performed, X ray examination showed that at the end of 15 minutes half of the food had left the stomach, and at the end of 1 hour and 15 minutes the stomach was almost empty.

Five months later, when the child was aged 9 months, X ray examination showed that at the end of 15 minutes after the meal some food had left the stomach, and one hour after the meal half the food was present, and two hours after the meal the stomach was empty. It is true that in other wasting conditions of infancy, as will be shown later, emptying is very rapid, but in spite of that we think that the facts detailed are strong evidence for assuming that the sphincteric control is greatly diminished immediately after operation, and recovers some months later.

CHEMICAL INVESTIGATIONS.

These are part of an investigation into the stomach contents of wasted babies by the fractional test-meal method. This investigation was undertaken to determine if it is possible by such means to define certain groups of cases amongst wasting babies, and to determine if Miller and Willcox's [3] conception of a pylorospasm due to hyperacidity was a correct one. It is hoped to publish the results of these investigations later. In the present communication only those referring to pyloric stenosis will be dealt with.

The test-meal is a 2 oz. meal, consisting of equal parts of milk and water. An interval of three hours is allowed between the last meal and the giving of the test-meal, and the stomach contents are withdrawn every half hour. We have not found it practicable in babies to remove the contents as frequently as at 15-minute intervals. The contents are removed by passing into the stomach a No. 6–7 Jacques soft rubber catheter, and withdrawing them by means of a record syringe. We should like, as a routine, to have had a longer interval between the giving of the test-meal and the previous meal, but as the cases investigated were those of wasting babies this was not thought advisable. Bile is rarely found in the withdrawn stomach contents in these subjects. We have never found it in pyloric stenosis, and its presence in the stomach contents or in the vomit we believe completely negatives the condition. The rate of emptying varies considerably in wasting babies. For instance, it may be impossible to obtain milk half an hour after feeding, but the average rate appears to be such that it is not possible to obtain milk from the stomach after a longer interval than two hours. In pyloric stenosis milk can still be withdrawn three hours after the test-feed; indeed, in one case milk was obtained

five hours after a feed. The character of the resting juice is also interesting. In pyloric stenosis there is usually present milk-clot in considerable quantity, and there is a high rennin content, high total acidity, and high free acidity. Milk-clot, however, is rarely found in the stomach in cases which are not pyloric stenosis.

The method of examining the stomach contents has been as follows: The rennin has been estimated by the method described by Miller and Willcox,[3] and we have used both Topfer's method for estimation of free and combined acids and Volhard's method for the estimation of total chlorides. Except for what has been stated above we have so far not been able by Topfer's method to determine any curve of stomach secretion which could be regarded as typical of pyloric stenosis; Volhard's method has, however, shown (in the few cases in which it has been used) an absence of duodenal regurgitation when the curves were examined in the light of Bolton and Goodhart's [4] work.

HYPERADRENALISM IN THE MOTHER.

In a paper published recently Gray and Reynolds[5] elaborated Gray and Pirie's [6] theory that pyloric stenosis is due to hyperadrenalism in the mother, and they set forth this theory as an explanation of two things—viz., the hypertrophy of the pylorus and the diarrhœa which occurs in many cases after Rammstedt's operation. Their statement runs as follows:—

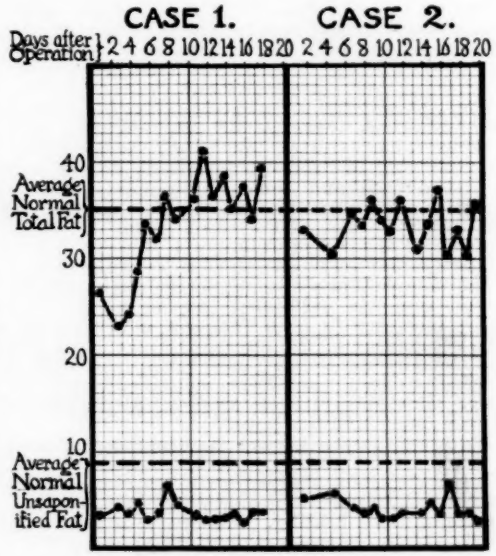
"There is only one cause of localised hypertrophy of a muscle, and that is over-use. Clinical evidence appears to us to support the view that closure of the pyloric sphincter is controlled by stimulation of the sympathetic nerve-supply and by its hormone (adrenalin), and the logical inference is that the pyloric hypertrophy is associated with hyperadrenalism, the result of excessive sympathetic stimulation . . . Now there is no evidence of hyperadrenalism in the child, but since it is generally conceded that the hypertrophy takes place in utero, it is probable that the hyperadrenalism is maternal in origin. . . . Adrenalin being antagonistic to pancreatic function, it would be expected that pancreatic insufficiency (one manifestation of which is a failure to digest fats), would be a feature when obstruction is relieved. . . ."

They then go on to say that this failure in the digestion of fats is the cause of diarrhœa.

"We feel the balance of evidence to be in favour of the view that both pyloric hypertrophy and pancreatic insufficiency are separate, but interacting manifestations of original hyperadrenalism, a view further supported by the fact that the size of the pylorus bears no relationship to the severity of the symptoms or the course of the disease. Thus the surgical breach of the vicious circle, by pyloric section, cures the obstruction immediately, but leaves untouched the pancreatic defect, which takes roughly as long to be re-established to the normal as the duration of the original symptoms. This has an important bearing on post-operative feeding."

Now the effect of adrenin on the pancreas is transient, and its results are hyperglycæmia and glycosuria. Assuming pancreatic insufficiency, the result of hyperadrenalism, did occur, it therefore follows that the hyperadrenalism must be a continuous condition and, therefore, must be present in the child, for hyperadrenalism in the mother could not produce this condition in the child after birth, and yet Gray and Reynolds state that there is no evidence of this in the child, and with this we quite agree. But, as a matter of fact, glycosuria does not occur and the blood-sugar figures are similar to those found by Guy [7] in other wasting infants—i.e., hyperglycæmia is not present, but there is a hypoglycæmia. In one case where vomiting was extremely severe the blood-sugar three hours after a meal was only 0·021 per cent., the highest figure we have obtained three hours after feeding being 0·069 per cent.

Further, if pancreatic insufficiency were present in these cases, and if that gave rise to diarrhœa as suggested, two results should follow. First, diarrhœa should be a frequent symptom in the history as detailed by the mother. This is not the case, and diarrhœa, when it occurs in cases treated by medical means, it is a late symptom in the disease. Secondly, in every case, after relief of the pyloric obstruction, whether diarrhœa be present or not, fat-splitting should be deficient, with the result that the percentage of unsplit fat in the stools should be high. To investigate this point we have analysed the stools of cases on which Rammstedt's operation has been done. The total fat and unsaponified fats in the dried fæces has been estimated in all stools passed for three weeks, commencing with the day of operation. For the purpose of this investigation the first stools can be regarded as what they are in reality—namely, the stools formed before operation. The accompanying graphs show two of the cases in which this investigation has been carried out, and it will be seen that the



Graphs from two cases of pyloric stenosis showing the percentages of total and unsaponified fat in dried fæces for three weeks following Rammstedt's operation. The normal in each case is shown by the dotted line and is calculated from Holt, Courtney, and Fales,[8] and from H. S. Hutchison.[9]

fat-splitting is normal; in fact the amount of unsplit fat is well below the normal line. It should be pointed out that the lower curve really gives a reading that is somewhat higher than the true unsplit fat reading because it includes free fatty acid.

We would once more emphasise the point that if Gray and Pirie's theory be correct it must apply to every case; if it can be disproved in one or two cases it must be disregarded. These investigations show, we think conclusively, that the pancreatic function, as far as fat-splitting and carbohydrate metabolism is concerned, is normal and that the pancreas is not a factor in the production of diarrhœa, which may occur in cases treated either medically or surgically. We submit, therefore, that it is proved that there is no evidence of hyperadrenalism or of pancreatic insufficiency in the child.

Swale Vincent [10] has also criticised this theory from the standpoint of a physiologist, and it may be of interest briefly to recapitulate his points. He says that the evidence that adrenin constricts the pylorus is not convincing, and assuming that adrenin did act on the sympathetic, if there were hyperadrenalism its effects on the heart, blood-vessels, organic secretion, &c., would be so great that any increased constriction of the pylorus would not be noticed. He also says, in answer to a suggestion of Gray and Reynolds that emotionalism in the mother may be the cause of hyperadrenalism, that the emotional theory of adrenin secretion has never been firmly established, and asks the pertinent question, why is the mother herself unaffected by this hyperadrenalism?

CAUSATION OF DIARRHŒA.

The liability of these cases to diarrhœa is, however, a very important factor in treatment, and to ensure successful results it is essential to find out its cause. We believe that the diarrhœa may be due to one of two causes—viz., (1) faulty absorption, or (2) infective enteritis, a condition to which cases of pyloric stenosis, in common with other wasting conditions of infancy, are very prone. That absorption, not digestion, is at fault is, we think, obvious from the results quoted above—namely, that although fat may be in excess in the stools, it is present, not as undigested fat, but as split fat. Further, it is known that such stools are common in other wasting conditions, and, indeed, they may even occur without diarrhœa.

If faulty absorption be the essential factor, the condition of the small intestine is very important. If this is at all atrophic from disuse (which appears to be the case from post-mortem evidence) it cannot absorb any bulk of food, and, therefore, in treatment one should give frequent small feeds, leaving but little residue. We have found that diarrhœa is less frequent when such feeds are used in cases treated either medically or surgically. In cases where fat is present in the stools in excess, we give feeds having a low fat content—i.e., skim milk or a weak sweetened condensed milk mixture such as ½ dr. sweetened Nestlé's milk to 1 oz. of water.

Following on the results we have obtained we do not think it necessary to pancreatise the food before giving it to the child, and this is helpful in treatment because peptonisation of the milk imparts to it a taste which many infants dislike. The liability to infective enteritis is not greater in pyloric stenosis than in other cases of wasting from food disorders in infancy, and the methods of combating it are the same—e.g., scrupulous care in feeding, barrier system of nursing, limitation of number of such cases in a ward, avoidance of too long a stay in hospital, &c.

MEDICAL TREATMENT OF PYLORIC STENOSIS.

This was carried out in these cases on the usual lines, and on the principle that the chief exciting cause of the symptoms is pyloric spasm with blockage from swelling of the mucous membrane, although the underlying cause is the hypertrophy of the pylorus, which is of congenital origin. There are two great pitfalls to be avoided in medical treatment—first, the collapse that follows large vomits, by preventing such large vomits; and secondly, the getting of too large a quantity of food through the pylorus into the intestine which produces in many cases a fatal diarrhœa.

The indications for treatment are therefore three: (1) to relieve the gastritis; (2) to give food leaving a small residue—if this be done and the gastritis is relieved the result is the relief of the pyloric spasm; (3) to give frequent but small feeds.

The gastritis was relieved by washing out the stomach. Depending on the amount and frequency of the vomiting, the stomach was washed out once, twice, or three times in the 24 hours. If there was only one large vomit in the 24 hours the stomach was only washed out once; if more than one large vomit occurred the stomach was washed out twice or even three times, and the number of wash-outs diminished with the diminution in the vomiting. Wash-outs should not be left off too early, because of the liability to a large vomit which may be followed by a fatal collapse. After the first few wash-outs the child may be collapsed, but this should be guarded against by giving a dose of brandy after the wash-out. The wash-out should be given just before a milk feed is due; after the washing is clear the stomach tube may be used to introduce the feed. Wash-outs are given with an ordinary soft rubber catheter (No. 7 Jacques); a 1 per cent. sodium bicarbonate solution at 100° F. is used for this purpose.

Diet in Medical Treatment.

The diets given have been varied; if the child was fortunate enough to be breast-fed at the time of coming under observation—a rare occurrence—the milk has been withdrawn and 1 to 2 dr. have been given every hour. The breast milk is withdrawn because the effort of sucking may cause vomiting, and it is said also that it causes more pyloric spasm. Artificially-fed babies, who do not tolerate milk well, have been started on whey, veal broth, or a combination of raw beef juice and whey with or without cream (we should not now use cream) or even albumin water or plain water. If these were used, milk feeds have been started as soon as possible and the amount of food slowly increased. Our preference has been for citrated milk, starting with 1 to 2 dr. hourly; occasionally peptonised milk has appeared to suit better. Dried milks like Glaxo have also been used in a few cases. Beginning in this way, the diet was slowly increased and the intervals between the feeds lengthened. If vomiting became marked the amount was diminished, and when diarrhœa occurred weaker mixtures and smaller feeds were given. In addition to this treatment we have tried nasal feeding to diminish the frequency of the vomiting. This was suggested and practised successfully in one case by the late Dr. F. E. Batten. Subcutaneous and rectal salines have been given, and inunctions of cod-liver oil have occasionally been tried. As in all cases in wasting infants the necessity for warmth has been insisted upon.

Results of Medical Treatment.

The results of this treatment rigidly carried out have been in our hands very disappointing. The actual figures are 36 cases with 5 cures, which gives a recovery rate of 13·8 per cent. We must admit that these figures contrast very strikingly with those of John Thomson,[11] who gives a recovery rate of 42·5 per cent. in 61 cases treated by medical means. He states that his hospital statistics have been considerably worse than his private cases. We have seen very few cases in private, but not one has recovered on medical treatment only. On the other hand, Warren[12] gives 30 cases in the East London Hospital, treated medically, and all died but one, and that, he states, was a doubtful case. Gray and Pirie give Great Ormond-street statistics for 1915–16–17, and out of 54 cases, the mortality was 80·5 per cent., this included a certain number of cases operated upon, the latter giving a death-rate of 100 per cent.

Treatment, even in the cases that recovered, was a very long process, lasting three to four and even six months. The course of recovery was marked by a succession of ups and downs, a long period of time in which no increase in weight occurred, or in which the gains were very slight and frequently did not neutralise the losses. At any time during the treatment a fatal attack of diarrhœa or fatal collapse after a vomit might occur. In the fatal cases death occurred from: (1) asthenia, after progressive wasting or after a long period of more or less stationary weight; (2) sudden collapse following a large vomit, or occurring at times without vomiting; (3) diarrhœa, either an infective enteritis, or of the non-absorptive type. In any case treated by medical means, if the child can be kept alive until about six months old, improvement will occur, and after that age set-backs are rarely seen.

SURGICAL TREATMENT OF PYLORIC STENOSIS.

Owing to the war an opportunity was given to review the results of medical treatment whilst away from civil practice. During this period better methods of combating shock were evolved and the necessity for speed was realised more than previously. We were determined on returning to children's work that all cases of pyloric stenosis should be operated on, in order to see if better results could be obtained than by medical means, and also because to make operative procedure the routine in every case was the only way in which a real comparison could be made with medical treatment, and to give us an answer to the question—Does surgical or medical treatment offer the better chance of success?

Prior to this, surgical treatment was adopted in a few of our cases, but all of these had been unsuccess-

fully treated by medical means, and it was only after a varying period of such treatment and owing to its lack of success, that surgical treatment was undertaken. The operation in each case was gastro-enterostomy; in all, eight cases were operated upon with two recoveries. We decided to make this the operation of election. However, before we were able to put this determination into practice, Gray and Pirie's [6] paper on Rammstedt's operation appeared and we were so impressed by it that we determined to make use of this operation. Until recently surgical treatment of these cases has not been generally resorted to. Procedures such as pyloroplasty, forcible dilatation of the canal (Loreta), and gastro-enterostomy have been tried tentatively by surgeons, usually in cases that had done badly under medical treatment; altogether a fair number of cases have been operated on by one or other of these methods. Thus Fisk,[13] in a review of 71 cases which had been operated on by various surgeons up to the time of his paper, gives the following figures: 42 gastro-enterostomies, mortality 43 per cent.; 11 pyloroplasties, mortality 45 per cent.; 18 divulsions, mortality 50 per cent. Total 71 cases. Mortality all methods 46 per cent.

These figures probably represent the best results that are to be obtained by these methods. Gastro-enterostomy was the method of choice in the majority of cases, though the exposure of the abdominal contents involved, and the length of time taken by the operation, make it unsuitable for these patients, and it is not free from the occasional post-operative risks. An otherwise successful case, upon which Mikulicz performed gastro-enterostomy, died from peptic ulcer of the jejunum two months after operation. The introduction of Rammstedt's operation has given us a procedure at once simple and efficient to deal with the mechanical problem presented by the condition.

Examination of transverse and longitudinal sections of the pylorus shows that its mucous membrane is compressed by the thickened circular muscular coat, so that its lumen is stellate or U-shaped on transverse section, and longitudinal incision of the serous and muscular coats down to, but not through, the mucous layer allows prolapse of the imprisoned mucous membrane and restoration of the lumen of the canal. Such a procedure is easily and quickly carried out, involves little exposure of the abdominal contents, and, moreover, appears to have no deleterious effects on gastric or duodenal physiology, as the food passing by the natural channel over the duodenal mucous membrane supplies the normal stimulus to pancreatic secretion and permits effective neutralisation of the acid chyme—functions interfered with by a short-circuiting operation such as gastro-enterostomy. As the result of increasing experience with this operation we have gradually superseded purely medical treatment in the greater number of cases, and believe that the best results will ultimately be obtained, if relief of the stenosis is considered essentially a surgical problem. The dieting of cases after operation presents many difficulties to the physician, and careful preparation for operation and skilful and devoted nursing in the post-operative period are as essential as a carefully executed operation if success is to be achieved; the margin of safety being a very limited one in many of the cases.

PRE-OPERATIVE TREATMENT.

After the diagnosis is established two or three days should be allowed to elapse in order to get the patient in the best possible condition for operation. During this period weight may be gained to a small extent, though frequently it remains stationary or falls in spite of ideal conditions. Lavage of the stomach twice a day diminishes gastritis and lessens the swelling of the mucous membrane of the embarrassed pylorus, and prevents absorption of decomposition products. Feeding along lines previously indicated is carried out up to within four hours of operation. It should be supplemented, if possible, by the addition of glucose and water between feeds. In patients who are very wasted, subcutaneous saline may be given daily in small amount (5 oz.), and one hour before operation fluid should always be thus given into the axillæ. Five hours before operation a rectal wash-out is given, lavage of the stomach performed two hours before operation, whilst by mouth a drachm of glucose in 1½ oz. of water may be given one hour before operation. The patient's limbs should be bandaged in cotton-wool and atropine 1/400 gr. administered half an hour before operation.

OPERATION.

Every attempt must be made to diminish shock, by gentleness, conservation of heat, and speed. A theatre temperature of 75° F., and hot-water bottles in proximity to the patient are necessary, whilst careful planning of the details of the operation allow it to be carried out in an unhurried manner in from 7 to 9 minutes. A mixture, two parts of ether, one part of chloroform, has been used to anæsthetise the majority of our patients. Latterly the use of nitrous oxide and oxygen has been tried as suggested by Gray and Reynolds, and we now favour it as the anæsthetic of choice and hope to diminish the mortality by its further use. Great care must be taken to keep the infant well oxygenated throughout, whilst to assist relaxation at the appropriate moment the mixture may be bubbled through the ether-chloroform mixture mentioned for a few moments prior to suture of the abdominal wall.

The abdominal incision should be two inches long and commence half an inch below the right costal margin, at the junction of the lateral one-third with the medial two-thirds of the right rectus. When the peritoneum is opened the liver appears in the upper two-thirds of the wound, and on retracting the lower angle the dilated pyloric segment of the stomach is seen. This is gently drawn out and held by the assistant with a mop. Along the slightly tautened lesser curvature the operator's finger seeks the pylorus to the right of the spine. The fixation of the pylorus varies very much. At times it lies closely applied to the posterior abdominal wall; at others it can be readily drawn up to the wound. Traction on the pylorus should be avoided as far as possible, and in seeking to bring it into view when it is fixed, the operator must depress the margins of the wound down to its site. With the pylorus held firmly between forefinger and thumb of the left hand, its anterior surface is in full view and the longitudinal incision can be delicately made when resting the knife hand on the abdomen to the left of the wound. The incision is placed as near the upper border of the pylorus as possible. Its length is about three-quarters of an inch, but varies with the length of the thickened pylorus. Starting a third of the length of the pyloric segment from the duodenum, it deepens as it reaches the middle of the thickened portion and becomes shallow as the stomach is approached. When the centre of the wound reaches a depth of about 3 mm., the whitish mucous membrane comes into view and is easily distinguishable. It is our custom to complete the operation by a blunt dissection, and for preference we use the rounded end of a Watson Cheyne dissector. With this instrument the thickened muscle at the two ends of the wound is gently torn through, allowing the mucous membrane to prolapse till it is almost flush with the serous coat throughout the length of the wound. Towards the duodenal end the greatest care must be taken, as the muscular coat thins abruptly and the mucous coat here is thin and adherent and may easily be torn through in deepening the incision. At the proximal end of the incision the thickened pyloric muscle gradually shades into the musculature of the stomach and no difficulty is found in carrying the section in this direction. Prolapse of the mucous membrane is favoured by gently squeezing the pylorus with the finger and thumb and by undermining the mucous membrane on either side of the incision. Bleeding is usually very trifling, but at this stage the pylorus should be released and then watched for a few moments. Occasionally bleeding is free, generally at the gastric end of the incision; if touched with a mop

moistened with hydrogen peroxide the oozing ceases and a fine catgut suture should underpin any point which is still bleeding. We lost one case in our series from such hæmorrhage before the danger was recognised.

The pylorus is now allowed to fall back into the abdomen and the wound sutured in three layers. In three cases we covered the wound of the pylorus by an omental graft, but this measure prolongs the operation and appears to offer no special advantage; post mortem, in cases where no graft is applied, the incision is found filled with organised lymph and flush with the serous coat. In addition to the variation in fixation of the pylorus which has been noted above, it will be found to vary in size and in vascularity, points which are of importance in carrying out the operation. The thickened muscular cylinder of the pylorus is characteristically hard in all cases, but varies in length from about three-eighths to three-quarters of an inch, in the short type the mass will feel almost spherical, whilst the long variety will be definitely cylindrical. The length of the incision through the serous and muscular coats must vary with the type. We are, however, unable to correlate any variation in symptoms in the two types. Typically the pylorus is white and avascular, but from time to time specimens are seen which are red and bleed freely on incision. Apart from this, occasionally a vessel is divided in the incision in the avascular type, which gives rise to troublesome bleeding.

POST-OPERATIVE MEASURES.

After operation the patient, on being placed in bed, is warmed up by being put beneath a cradle, from which two or three electric lights are suspended, and is given a small rectal saline containing 1 dr. glucose, before coming fully round from the anæsthetic. This is repeated four-hourly for 12 hours, and then six-hourly for 24 hours. If the rectal salines are retained they may be administered eight-hourly for another day. Two hours after the anæsthetic 10 minims of brandy in 1 oz. of water may be given by the mouth, and this is repeated two-hourly until at 12 hours after the operation the first feed of milk and water is given. This feed consists of half an ounce of milk and half an ounce of water, or if the child is breast-fed 4 to 6 dr. of breast-milk previously withdrawn, to which is added 4 to 6 dr. of water. This is given two-hourly for 24 hours, and during this period the dose of brandy is dropped to 5 minims, or may be stopped altogether. The milk is now increased slowly until 1 oz. of breast-milk or 6 dr. of milk and water are being taken two-hourly. In addition glucose and water is given if the child is thirsty.

After an interval of three days from the operation, feeds are made three-hourly ones, and the amount at a feed is continuously but cautiously increased by about a drachm at a time; at the end of a week after operation the child should be having about 1½ oz. of milk and 1½ oz. of water, or a 3 oz. breast-feed. We do not aim at getting a rapid increase in weight, but prefer a slow and steady rise; indeed, some of our cases which have recovered have shown very little increase in weight for the first fortnight. Originally we gave larger feeds, as advocated by Gray and Pirie. By this method considerable increases in weight occurred very soon after the operation, but the risk of diarrhœa appeared to be appreciably more than by the method we now adopt. Indeed, diarrhœa is largely eliminated by this method of giving small feeds. We keep the cases in hospital about four weeks, and they are usually sent home taking equal parts of milk and water, about 2 oz. of each, or 3 oz. of breast-feed.

RESULTS.

Fifty cases in all have been operated on, 42 males and 8 females. Of these 43 were hospital cases and 7 were private cases, two of the latter being children of medical men. Of the 50 cases, 26 were cured and 24 died, giving a recovery-rate of 52 per cent. All the private cases recovered.

It has been our rule during the period under review—1920, 1921, and part of 1922—to operate on all cases of the disease which have come under our care, and it will be seen from the weights of the cases that many of the hospital cases were extremely asthenic when they were first diagnosed. The average weight of the "cured" cases was 7 lb. 1 oz. at operation, whilst that of the "died" cases was 5 lb. 12½ oz., the lowest weight being 4 lb. 6 oz. One case (our first), which was 5 lb. 5½ oz. at operation, gained 10½ oz., and then died three weeks after operation of enteritis. With improved after-treatment it is believed that such a case might now be saved. This particular case was cyanosed and cold when first admitted to hospital, and improved greatly at first in the post-operative period.

In the fatal cases the survival period after operation was as follows: Under 24 hours, 9; 24 to 48 hours, 3; 48 hours to 1 week, 4; 1 to 2 weeks, 3; over 2 weeks, 5. Total 24.

The last five cases died between the fifteenth and thirty-fifth days after operation, enteritis being the cause of death in all cases but one, this case dying of pneumonia. The post-operative gain of weight was as follows in three of the above cases: 8 oz., 5 oz., and 10½ oz, and we attribute death in these cases chiefly to the too rapid increase in the post-operative diet, a danger which has been considered above in discussing after-treatment. Twelve cases died within 48 hours of operation. In one of these hæmorrhage at the site of incision was the cause of death, though one bleeding vessel had been underpinned at operation. Another case died of convulsions, which were present both before and after operation, and one patient, after doing well for 24 hours, developed hyperpyrexia (105°), and died the second day. A case dying at the end of 12 hours showed at post-mortem collapse of both lung bases with early left-sided broncho-pneumonia. In other cases death appeared to result from post-operative collapse without definite post-mortem findings. Two other cases which survived from two to three days died after rallying from severe post-operative collapse, and may reasonably be included amongst those dying of the effects of operation. In one case which lived four days, the duodenum was accidentally opened at operation, and in another case re-suture of the abdominal wound had to be performed on the eighth day and the patient afterwards died of broncho-pneumonia. One patient died suddenly on the eleventh day without assignable cause, after a quiet convalescence up to the time of death.

In judging the mortality of the operation as presented in this series of cases, due consideration must be given to the fact that all cases of the disease presenting themselves were operated on without selection. Representing, too, as they do the first cases operated on by a new method, improvement should follow familiarity with the operation, and improvement in technical details, and such operative accidents as hæmorrhage from the incision and opening the duodenum, should be eliminated by experience. Gas and oxygen as an anæsthetic appears eminently suitable and should reduce the high mortality resulting from post-operative collapse. Above all, we feel that only by early diagnosis and early operation can the mortality of the disease be radically lessened, and in this connexion we would point out the great difference in the average weight of the cases that recovered, compared with that of those that died; though for the most part babies who develop the condition are well nourished at birth. Also the difference in the recovery-rate of our private cases (100 per cent.) and hospital cases (44 per cent.) is significant.

In a series of 38 cases operated on by Gray and Reynolds the mortality is given as 55 per cent. They exclude, however, four fatal cases, because two of them died of an epidemic which was prevalent at the time, and two died from accidental causes early in their experience. If these four cases are included, as they should be if the series is to be contrasted with ours, it gives them a recovery rate of 41 per cent. Taking into consideration their figures and our own, we think that a fair estimate would be that in cases diagnosed

early, whose weight was about 7½ lb., at least 80 per cent. could be cured by this operation.

POST-OPERATIVE PHENOMENA.

Occasional vomiting after operation is usual and may occur from time to time during the first fortnight in cases that are otherwise convalescing satisfactorily. The vomits, however, in frequency, in amount, and in character, in nowise resemble those seen in the cases before operation. We were at first inclined to regard them as due to an operative error—that in over-anxiety to avoid opening the duodenal mucosa we had left a ring of pyloric muscle untouched by the incision. We have seen no ill-result following from this cause, however, provided the mucosa on the stomach side of the pylorus and of the greater part of the canal is well freed. The vomiting is rather the result of an over-acting and hypertrophied stomach accompanied by gastritis, and a stomach wash-out will sometimes relieve this vomiting absolutely.

Post-operative pyrexia is common and in the cases that recovered varied from 100° to 102·4°. In three cases that died within 48 hours of operation, the temperature reached 104·8°, 105°, and 106°, and such hyperpyrexia appears to constitute a danger, although Gray and Reynolds quote a case with a temperature of 106° which recovered. In discussing this question they consider this hyperpyrexia to be almost wholly due to the anæsthetic, and that it is almost entirely eliminated by the use of gas and oxygen. We feel that the risk both of post-operative pyrexia and vomiting will be diminished by careful pre-operative preparation.

The dangers of post-operative diarrhœa have already been mentioned, but we would like once more to emphasise the point that we treat the diarrhœa when present by giving small and well-diluted feeds, and also we administer the mist. ol. ric. cum hydrarg. of the Great Ormond-street pharmacopœia. If soapy stools are present, then milk with a poor fat content—e.g., skim milk or Nestlé's condensed sweetened milk—is used as previously indicated.

Our earliest cures were operated on over two years ago and in all who survived, digestion, growth, and development have been satisfactory once the initial difficulties of the post-operative period have been passed, and the operation, relieving as it does the temporary obstruction of the pylorus, yet appears to inflict no permanent injury on the sphincter action of the pyloric muscle, which is shown by X ray examination to have recovered its function after some months.

SUMMARY.

1. The paper is based on an analysis of 94 cases of the disease, of which 36 were treated by medical means, 8 by gastro-enterostomy after failure of medical measures, and 50 by Rammstedt's operation.

2. The results of medical treatment alone are very unsatisfactory.

3. Relief of the obstruction by Rammstedt's operation preceded and followed by a careful medical regime offers the best means of reducing the high mortality of the disease.

4. Rammstedt's operation allows the redundant mucous membrane to bulge and for a time abolishes the sphincteric activity of the pylorus.

5. Given early diagnosis and resort to treatment as above, we believe the mortality can be reduced to 20 per cent.

6. Functional test-meal examination of the stomach shows high rennin, high free acidity, and high total acidity in the resting juice, delayed emptying and absence of duodenal regurgitation.

7. Chemical analysis of the stools negatives the suggestion that these patients are suffering from pancreatic insufficiency.

8. This and other evidence is opposed to the hyper-adrenalism theory of the cause of hypertrophy as put forward by Gray, Pirie, and Reynolds.

We wish to express our thanks to our colleagues at the Birmingham and Midland Free Hospital for Sick Children for allowing us to make use of their records, to Mr. L. C. Brookes, assistant in the biochemical department, for his kindness in carrying out the chemical analyses, and to Dr. Henry Featherstone, honorary anæsthetist to the hospital, for his skilled assistance in the performance of operations.

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ADDISON'S ANÆMIA.

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AMONG the many explanations for the origin and nature of Addison's, or pernicious, anæmia, one is so simple and yet so sufficient that I venture to bring it forward for the consideration of those who are interested in the subject.

According to this theory Addison's anæmia is no more than a premature degeneration or senescence of the red blood organs. At first sight nothing can seem wider of the mark than the suggestion that a disease characterised by the extreme youth and vigorous growth of cells should be a manifestation of a time of life we associate with sloth, atrophy, and decay. Evidently for such a theory to be entertained we must have a conception of the nature of the senile change different from that now usually held. Elsewhere[1] reasons have been given for regarding the degeneration of old age as a reversal, whereby the body as a whole, or its organs individually, roughly speaking retrace the steps of their development and resume their young state. In other words, not only is there a second childhood of the body as a whole, but each organ is liable to become less complex, to fall back into a state of simplicity reminiscent of the earlier stages of its development. In the case of some organs the occurrence of such a cycle is fairly obvious. Thus both the male and female reproductive organs, which begin their active life at adolescence, tend to resume their infantile forms in old age. Cell systems of the brain also lose their arborescent processes and return to a simpler form; and similar reversal may be witnessed in the jaw and other organs.

Senility and Pernicious Anæmia of the Aged.

But in normal conditions we know nothing of a blood state at 70, or even at 100, in any way comparable with that of the embryo or of the fœtus. There are at least two reasons for this. The first is that the blood, unlike the reproductive system, being one of the first of the tissues to develop, is therefore one of the last to decline. Its life cycle is indeed so long that in normal circumstances it is never completed. Other vital organs with shorter cycles begin and finish earlier, and so put an end to life before the blood has arrived at senescence. The second is that among the old a blood state which is either that of Addison's anæmia, or is on the verge of Addison's anæmia, is more common than is generally supposed. I have myself seen examples of this pernicious anæmia of old age only because I have been on the look-out for it for many years. I believe that in each case death would ordinarily have been certified as due to "senile decay." In the very old the symptoms of the anæmia so merge into those of senility that, failing a special blood examination, the blood disorder is not easily to be recognised. I regard this as strong evidence that Addison's anæmia is no more than an antici-

[1] Gilford, H.: Disorders of Postnatal Growth and Development, 1911.

pated senescence of the erythrocyte organs. As might be expected of a diseased state due to premature senescence, the younger the patient, or, in other words, the earlier the degeneration, the more malignant the disease.

Probably in order that there should be a degenerative overgrowth of the red marrow it is essential that it should occur prematurely. There must be not only degeneration of the one system of organs but comparative youth of the body in general.

Predisposing Factors.

For Addison's anæmia to arise one of two things is necessary. One is some strain on the red blood organs such as is calculated to break them down, to render them senile before their time. The other is an inherent disposition of these organs to become prematurely aged. And this poorness of stock, conducive to a short life, may be hereditary. As a matter of fact, properly to understand the abnormal state we are now considering we must regard it in its biological or genetic aspects rather than as a problem of pathology. For if it be a manifestation of premature senescence, Addison's anæmia is evidently in the first place a biological extreme, and only in the second place a disease. Now the biological term for such extremes of normal processes is "variation," and if Addison's anæmia be of such a nature we may expect it to occur in one, or both, of two forms. We should anticipate that there is a form in which a tendency or predisposition to early senility so coöperates with certain external or exciting agents as to produce the variation. We have no difficulty in recognising these two factors in the production of Addison's anæmia.

Among these external, active, environmental agents are any circumstances calculated to worry, or irritate, or poison the red marrow as an organ, causing it to live a short life, to break down prematurely. Among them we must above all include such poisons as act constantly and over long periods so as insidiously to overcome, less by the vigour of their attack than by its persistence. Chief among them are certain toxins poured out constantly into the intestinal tract, the toxins of syphilis, lead, and occasionally arsenic or X rays. Prolonged bleeding may also apparently so exhaust the vitality of the red marrow as to bring about its degeneration, especially if the body in general be debilitated by cancer, by age, or other cause. Probably in every case the passive, intrinsic, or predisposing factor is also present, acting with an intensity which varies from that of a slight predisposition at the one extreme to an irresistible bias at the other.

Addison's Anæmia a Variation.

This is tantamount to saying that Addison's anæmia is a variation. It is that form of variation which is the outcome of inborn tendencies acted upon by an environment congenial to degeneration. It is a fluctuation. Regarded in this light any evidence of heredity is of importance, for the more definitely such transmission occurs the more convinced are we that we have to do with a disorder which has its springs in something inherent to the body. Now it cannot be said that instances of the hereditary transmission of Addison's anæmia are common; indeed, if we may judge from the number recorded, they are decidedly rare. Yet so uncommon is the disease that every case has so much the more significance. Only a few weeks ago I was consulted by Dr. A. N. Hooper about a lady of 65 who had advanced Addison's anæmia, for which no cause could be found, and from which she afterwards died. I then heard that two of her first cousins had died from the same complaint, and that a sister had died in childhood from purpura hæmorrhagica.

Some 12 years ago I recorded[1] a still more definite example of this kind of heredity. In a family of ten brothers and sisters, one brother died at 26 and a sister at 20, both from Addison's anæmia. An uncle had also died from Addison's anæmia at 63, and his mother had died from "extreme nervous prostration" at 60, no other cause being known. In each case the nature of the anæmia had been verified by blood examination. Since then another brother has died at the age of 35 from the same complaint, and a post-mortem examination failed to reveal any cause for the anæmia. Nor could any cause be found among the other cases. G. L. Gulland[2] has "come across three cases in people in middle life whose fathers had died of pernicious anæmia, in one case 10, in another 12, and in the third eight years before." Gulland and Goodall[3] write that "it is quite common to get a history of one other case in the family, and in one instance a patient's father, paternal uncle, brother, and sister had all died of the disease." Still more recently a convincing instance of heredity has been recorded by A. J. Patek,[4] in which in the same family an uncle, his niece, two nephews, and one cousin died from Addison's anæmia. In one of these nephews the disease took the aplastic form and was associated with sclerosis of the spinal cord. Blood examinations were made in each case.

It is characteristic of biological variations that when heredity takes place the variation which is transmitted is apt to begin earlier and to occur in a more malignant form in each succeeding generation. Such "intensification" and "anticipation" may be observed in some of these instances of hereditary pernicious anæmias. But it is hardly to be supposed that a disease coming on intensively in a youth will be manifested in the same way as when it arises in an old man. Hence we must expect that Addison's anæmia will sometimes be much modified by its occurrence in the young. Now there is good reason to regard aplastic anæmia as such a modification, and it will have been noticed that one of Patch's cases was aplastic. Moreover, in my first example of heredity a niece died from "purpura hæmorrhagica," with symptoms highly suggestive of aplastic anæmia. A good deal of evidence has been gathered to show that hereditary weakness in an organ, such as leads to premature senescence, is manifested in the form of a delay or arrest of progressive development. In other words, what is a premature senescence in the father may appear as a defect of development when anticipated in the son. Hence it is suggestive that Addison's anæmia occurs with all degrees of severity according to the age of its onset. In the old it is a comparatively benign complaint. In the young it is much more severe and may assume a malignant and fulminating form in aplastic anæmia. In this disease there is every indication of an arrest of development or infantilism of the red blood organs culminating in premature degeneration or senilism.

In aplastic anæmia the halt in the development of the red marrow may be so obvious and the absence of an exciting cause so complete as to suggest that the disorder is a germinal variation or mutation rather than a fluctuation. But so far the evidence of heredity is not strong enough to enable us to be sure on this point.

Developmental Origin of the Disease.

The picture of Addison's anæmia which now presents itself is as follows. Owing to an inherent defect in the red-blood-forming organs of the body, assisted in varying degrees by a debilitating and ageing environment, these organs become prematurely worn out and senescent. Nothing is more conducive to such a shortened life than a shortened period of progressive development whereby the whole cycle first of progress and then of regress is curtailed. The red marrow passes through its second infancy to a phase of regressive development comparable with that of its fœtal condition in progressive development. Its cells now simulate those of the embryonic marrow, but apart from their primitive aspect there is no ground for assuming that they are really embryonic. There are notable differences between the marrow filled with genuinely young cells engaged in constructive work, such as may be observed in young life

[2] Gulland, G. L.: Brit. Med. Jour., 1907, i., 71.
[3] Gulland, G. L., and Goodall, Alex.: The Blood, p. 101.
[4] Patek, A. J.: Jour. Amer. Med. Assoc., 1911, lvi., 1315

or after severe hæmorrhage, and the marrow of Addison's anæmia. So also is the destiny of the cells different. Those of the marrow engaged in the repair of blood tissue are not destroyed, but fulfil their proper task as members of the newly formed blood community. In Addison's anæmia, on the other hand, the swollen marrow behaves far more like a neoplasm than like a normal organ. Its tissue is in a state of insanity, for its cells multiply incoherently without method, and are poured into the blood-stream apparently for no purpose but that of destruction. They are not really embryonic, but are quasi-embryonic or embryonoid. Such retrograde cells, incapable of improvement, are to all intents foreigners. As Woods Hutchinson long ago pointed out, they are comparable with the blood discs of some lower animal, and therefore go the way of all alien cells when introduced into the blood. Some of the salient features of Addison's anæmia perpetuated in its various names are also indicative of a disease of developmental origin. Thus it is a "primary" or "essential" anæmia, for it is self-dependent and not a manifestation of some other morbid state. This is consistent with the view that it has its basis in a physiological process, rendered pathological by occurring before its time. For the same reason its causes are obscure. It is "cryptogenetic." Then, like all developmental processes, Addison's anæmia is "progressive." And as development is never in a straight line, but is always variable or rhythmic, so also is the course of this disorder uneven or wavy. And as there is but one ending to normal senescence, so also is every case of Addison's anæmia "pernicious," "malignant," and fatal.

If the view now advanced be correct, then the place which Addison's anæmia should hold among diseases is with the errors of development. We are too prone to assume that development can go wrong only in its opening phases, for there can be no shadow of doubt that its closing phases must also be open to mistakes. Moreover, as every organ is liable to such errors of omission and commission it is hardly possible that such an important organ as that which forms the red blood should be exempt. Failure of the red blood organs to develop we recognise in aplastic anæmia; too early senescence in pernicious or Addison's anæmia.

The above, then, is a rough sketch of the theory. It is believed that by its means every fact that is recorded about Addison's anæmia can be naturally and easily fitted into its place in relation to other facts. Furthermore, there are other diseases closely allied to Addison's anæmia which can readily be explained in a similar way. For instance, if one makes allowance for differences in structure and function, the same explanation will apply equally to leukæmia as to Addison's anæmia. In leukæmia there is also an enormous over-production of cells—though in this case it is of leucocytes, not of chromocytes—and the same blight of degeneration which produces such a copious supply of inferior, embryonoid, cells interferes with the mechanism which would ordinarily ensure their destruction. In Addison's anæmia the degenerated red blood discs, so lavishly poured out by the bone marrow, are prevented from accumulating by the enhanced activity of their destructors. In leukæmia the decrepit white cells are hoarded away in the spleen and in nooks and crannies in other parts of the body until they disintegrate and their débris litters the blood-stream.

In all other fundamentals of origin, cause, course, and treatment there is no essential difference between Addison's anæmia and leukæmia, and the explanation now brought forward does away with the necessity for attempting to account for these two similar disorders in totally different ways.

It is now recognised that leukæmia is a neoplastic disorder, in no essential respects different from other neoplasias. Some 12 years ago a book[1] was written with the object of showing that there is a large and important class of diseases characterised by the return of cells or tissues to a quasi-embryonic state and by possessing certain other basic characters of form and function in common. Among these were Addison's anæmia, leukæmia, and the cancers, and the evidence that has been collected since this book was written has tended to confirm the truth of this theory. Thus what can be more suggestive than some recent results of unintended experiments with radium and X rays? Under their influence the skin may become prematurely senescent and cancerous, the blood organs leukæmic or affected with Addison's anæmia.

AN INVESTIGATION OF SECONDARY INFECTIONS COMPLICATING PULMONARY TUBERCULOSIS

AMONG SANATORIUM PATIENTS.

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THE problem of the clinical importance of secondary infections in pulmonary tuberculosis is one to which a great deal of time and work has been devoted; the generally accepted conclusion has been reached that all cases of open pulmonary tuberculosis are secondarily infected, and that this secondary infection becomes more obvious and of greater clinical importance if the patient is living in a town, tending to disappear when the patient is placed under sanatorium conditions. The disappointing results of the use of vaccines as a method of treatment have led physicians to abandon them as a routine and to regard secondary infection as an unavoidable complication in a large percentage of cases. The grave disturbances of health caused by the infection of areas of abnormal lung tissue by pyogenic organisms cannot be denied when the course of the ordinary case of simple bronchiectasis is considered; yet in pulmonary tuberculosis, with equally large abnormal lung areas thus infected, this complication is often overlooked, or, if recognised, ignored, because of uncertainty as to its clinical importance in an individual case and the lack of success in treating it.

It is my object in this article not to advocate the administration of autogenous vaccines in every case of pulmonary tuberculosis where the character and bacteriology of the sputum lead one to suspect a secondary infection, but rather to try to show that there are certain types of cases in which, even under sanatorium conditions, secondary infection of clinical importance can be recognised and will respond to autogenous vaccine treatment.

The Problem of Lack of Progress.

I am convinced that a careful consideration on the lines that I am going to suggest, of all cases that "hang fire" under sanatorium conditions, would suggest a secondary infection, amenable to vaccine treatment, as the cause of the lack of progress in a certain percentage; and further that this percentage could be recognised with sufficient certainty to warrant the lengthy procedure of the preparation and administration of a vaccine with a reasonable hope of success.

The chance that two or three of these cases came under my notice together emphasised the problem of their lack of progress, and the fact that they had so many features in common induced me to group them together for further investigation. A detailed description of one case will suffice for it to be recognised by anyone who has had charge of a tuberculosis sanatorium as one with which they are quite familiar.

Female, aged 32, suffering from pulmonary tuberculosis with tubercle bacilli in the sputum; disease of three years' duration; under sanatorium treatment for about the last six months. Gross disease of left lung, with well-marked fibrosis, some cavitation, extensive pleural adhesions, and a few small deposits in the right

TABLE I.

SERIES I.—*Cases with Secondary Infection of Clinical Importance Treated with Autogenous Vaccines.*

P.A. = Pyrexial attacks.

Nature and duration of disease.	Sputum organisms in order of preponderance.	After-history.
1. C. G. T.B. +. 3 years. Extensive one-sided lesions. P.A. every 4–5 weeks. (See Charts 1 and 2.)	Two types strep. Vaccine dosage 5–50 mill.	Disappearance of sputum. One mild P.A. in 8 months. Gain of weight. Able to do hard work.
2. O. G. T.B. +. 2 years. Extensive disease r. l. lobe. Offensive sputum. P.A. at irregular intervals. (See Chart 3.)	Pure strep. Vaccine dosage 5–50 mill.	Diminution and disappearance of fœtor from sputum. Left too soon to show any further result.
3. S. H. T.B. +. 4 years. Dense disease l. base. P.A. very acute every 6 weeks.	Two types strep. *Staphylococcus aureus.* Vaccine mixed strep. Dosage 5–50 mill.	No further P.A. at sanatorium. Sputum decreased. Able to return to work in town and continue for 15 months. Previously too ill to work for 3 years. Relapsed again after 15 months.
4. W. G. T.B. +. 2 years. Extensive l.-sided disease. P.A. every 4–5 weeks.	Two types strep. *Staph. aur.* Vaccine mixed strep. Dosage 5–50 mill. Two courses.	During first course of vaccine P.A. disappeared. Sputum unaltered. Attacks started again and controlled by second course of vaccine, but general progress of disease unaltered. Patient went slowly down-hill.
5. R. E. T.B. +. 2 years. Dense disease r. side, apical cavity. P.A. short and without symptoms.	Strep. 1 and 2. *M. catarrhalis. Staph. aur.* Vaccine mixed strep. Dosage 5–50 mill. *M. catarrhalis.* Dosage 20–200 mill.	Cessation of P.A. and levelling of a rather marked temperature swing. Disappearance of sputum.
6. W. R. T.B. +. Extensive lesions both lungs. Previous sanatorium treatment. Rather long drawn out P.A.	*Staph. aur.* Strep. Vaccine mixed *Staph. aur.* and strep. Dosage 5–50 mill. strep., 50–500 mill. staph.	Diminution in intensity and then disappearance of P.A. Disappearance of sputum. Gain in weight. Ability to do full day's work.
7. R. W. T.B. +. 5 years. Extensive lesion l. lung, following an operative broncho-pneumonia. Rather prolonged bouts of pyrexia, 7 days.	Strep. 1; *M. catarrhalis*, strep., 2; *Staph. albus.* Vaccine mixed catarrhalis and 2 strep. Dosage 50–500 mill.	Diminution of amount of sputum, becoming less purulent. P.A. almost negligible and very short, 1 or 2 days. Still under treatment.
8. W. B. T.B. +. 1 year. Extensive l.-sided disease. P.A. very acute and apparently connected with weather conditions.	*M. catarrhalis.* Strep. 1 and 2. *Staph. albus.* Vaccine mixed catarrhalis and both strep. Dosage 50–500 mill.	Diminished sputum and a great feeling of increased well-being, but vaccine treatment too short for accurate conclusions.
9. V. B. T.B. +. 3 years. Pyrexial bouts 5 in 8 months. Rather drawn out. Large scattered lesions both lungs.	*M. catarrhalis.* Strep. 1 and 2, hæmolytic. *Staph. albus.* Vaccine mixed catarrhalis and both strep. Dosage 50–500 mill. of each.	Gain in weight. P.A. 3 in 5 months, much slighter. Sputum unaltered. Feels much better. Doubtful as to result of vaccine.
10. W. S. T.B. +. 4 years. Extensive scattered disease l. lung. No definite evidence of cavitation. Rather prolonged P.A.	*Staph. aur.*, hæmolytic. Strep. 1, hæmolytic. *M. catarrhalis.* Vaccine mixed staph. and strep. Dosage 50–500 mill.	No P.A. since commencement of vaccine. Sputum decreased. No gain of weight for 3 months previous to vaccine. Gain of 8 lb. during next 3 months. Able to do full carpenter's work.
11. J. W. T.B. +. 2 years. Extensive disease r. lung with deposits on left. Very frequent P.A., accompanied by much bronchitis.	Strep. 1 and 2. *Staph. aur.* Vaccine mixed strep. Dosage 5–50 mill.	Diminution in intensity and number of P.A.; after full course of vaccine well enough to do light work.

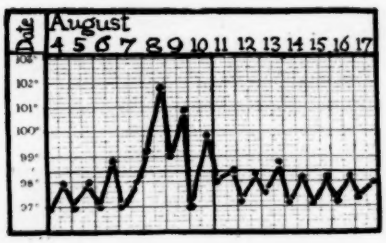
TABLE II.

SERIES II.—*Other Cases with Secondary Infection of Slight or No Clinical Importance Unaltered by Vaccine Administration.*

Nature and duration of disease.	Sputum organisms in order of preponderance.	After-history.
1. C. P. T.B. +. Dense r. lung disease with apical cavity. Long bouts of fever, accompanied by hæmoptysis.	Strep. 1 and 2. *Staph. albus.* Vaccine mixed strep. Dosage 5–50 mill.	No definite result during course of vaccine, but improved later.
2. K. M. T.B. +. Gross disease with cavitation l. lung after expansion of lung collapsed by artificial pneumothorax. No definite P.A., but long bouts of slight fever. (See Chart 4.)	*Staph. aur.* Strep. 1 + and 2. Vaccine mixed staph. and strep. Dosage 5–50 mill. strep., 50–500 mill. staph.	No result.
3. R. O. H. T.B. +. 2 years. Gross disease both lungs with apical cavitation. Continuous slight fever with exacerbation.	*M. catarrhalis* + Strep. 1 + *Staph. aur.* Vaccine mixed catarrhalis. Dosage 20–200 mill. and 5–50 mill.	No result.
4. R. T. T.B. +. 18 months. Extensive lesions r. lung, complicated by asthma and smouldering P.A.'s influenced by weather conditions.	*M. catarrhalis.* Strep. 1. Friedländer's bacillus, very few. Vaccine mixed catarrhalis. Dosage 50–500 mill. and 50–500 mill. strep.	No result.
5. F. E. T.B. +. 2 years. Dense disease r. lung with apical cavitation. Pyrexial bouts long drawn out.	Strep. 1 and 2. *M. catarrhalis*, very few. Vaccine mixed strep. Dosage 5–50 mill.	No result.
6. A. M. T.B. +. 4 years. Lesion extensive and dense both lungs, with cavitation in lower lobe. Continuous pyrexia.	Strep. *Staph. aur.* Vaccine strep. Dosage 5–50 mill.	No result.
7. F. F. T.B. −. 4 years. General condition and progress excellent. Extensive r. lung lesion. Sputum very excessive and purulent. Vaccine given to control sputum.	Strep. 1. + + +. Vaccine of strep. Dosage 5–50 mill.	Slight diminution in sputum.
8. H. T. T.B. +. 1½ years. Extensive r. lung lesion. General condition and progress very good. Influenced by weather conditions.	Strep. 1 and 2. *Staph. aur. M. catarrhalis*, fairly equal proportions.	No vaccine given.
9. S. D. T.B. +. 7 years. Very dense and extensive lesion l. lung with apical cavitation. General health and condition excellent. On full work (country). Sputum ℥i daily, purulent.	Strep. 1, pure culture.	No vaccine given.
10. A. D. T.B. +. 6 months. Slight pyrexia very frequently, but not in definite attacks. General condition good, but no progress.	*Staph. aur.* Strep. 1 and 2, very few. Vaccine dosage, staph. 100–1000 mill.	Vaccine only just started.
11. J. M. T.B. +. 1 year. Disease slight in both lungs. Continuous pyrexia.	Strep. 1 and 2. Vaccine mixed strep. Dosage 5–50 mill.	No result.
12. A. H. T.B. +. 1 year. Dense disease r. lung, collapsed completely by artificial pneumothorax. No recognisable disease in left. General health and condition excellent. On full work. Sputum daily purulent.	Strep. 1 and 2. *Staph. alb.*, a few. Vaccine of strep. 1. Dosage 50–500 mill. for control of sputum.	Vaccine only just started.

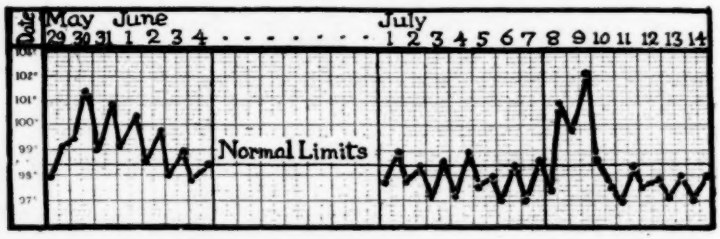
lung. Temperature and pulse within normal limits. General condition good and weight steady. Exercise to the amount of four to six miles daily. Sputum about 1 oz. daily; purulent; tubercle bacilli present. At recurring intervals of four to five weeks this patient suffered from a pyrexial attack lasting four to six days, with a sudden onset and temperature reaching between 100°–103° F.; subsiding by lysis. The attack was accompanied by general body pains, headache, malaise, and an increased quantity of sputum. The patient remained in this condition, neither gaining or losing weight nor making any progress for from four to five months. On bacteriological examination of sputum a streptococcus was isolated and was regarded as the predominant organism of the secondary infection. An autogenous vaccine was made and administered. The patient's

CHART 1.



Showing a typical pyrexial attack. (Series 1, Case 1.)

CHART 2.



Showing two typical pyrexial attacks. (Series 1, Case 1.)

condition during the next eight months was as follows: One mild pyrexial attack, disappearance of sputum, and an average gain of 2 lb. per month, and an ability to work five or six hours daily on a small poultry-farm without any constitutional symptoms. At the end of this time, feeling perfectly restored to health, but with physical signs in the lungs practically unaltered, the patient elected to leave the country and to go back to London. There was an immediate return of sputum and of pyrexial attacks, with exacerbation of all the symptoms. I believe the patient has been almost entirely bed-ridden since, during a period of 14 or 15 months.

Features Common to this Type of Case.

Comparing this case with others whose clinical history was similar, it was noticed that they had the following features in common: (1) Old-standing lesions; (2) periodical pyrexial attacks, with sudden onset and short duration, from which they apparently completely recovered; (3) extensive lesions, usually with evidence pointing to cavitation—that is, large areas of abnormal lung and bronchial surfaces; (4) streptococci, usually predominant among micro-organisms isolated from their sputa; (5) pyrexial attacks, usually controlled or materially altered by the administration of autogenous streptococcal vaccine.

TABLE III.—*Bacteriology of Sputum.*

Case.	(*a*) Before vaccine.	(*b*) After vaccine.
W. R. Series 1 Case 6	*Staph. aur.* Strep. 1.	Strep. 1 and 2. *Staph. albus.*
K. M. Series 2 Case 2	*Staph. aur.* Strep. 1 and 2.	Strep. 1 and 2. *Staph. aur.*
A. M. Series 2 Case 6	*Staph. aur.* Strep. 1.	*Staph. aur.* Strep. 1.

A bacteriological examination of many other cases in the sanatorium with extensive lesions was undertaken at the same time, and vaccines were prepared from the micro-organisms isolated; but it will be seen from the detailed reports on the previous page that only in those cases where the above five points were exhibited did vaccine treatment give satisfactory results, although the type of secondary infection was the same in both series of cases.

Auto-inoculation or Secondary Infection?

It might be argued that these pyrexial attacks, of which typical examples are illustrated in Charts 1, 2, and 3, were due to tuberculous auto-inoculations, but they never coincided with any increased exercise, nor did a careful questioning of the patient bring to light any of the usual reasons for a pyrexial attack. Sudden pyrexia in a hitherto afebrile case, if due to tuberculous infection, can usually be connected with some definite indiscretion or with an extension of disease capable of recognition by physical examination. No gross alteration in the condition of the lung lesion was noted during these pyrexial attacks.

I think it may be suggested that, in the first series of cases, the secondary infection was of such a nature as to have a definite effect upon the patient, that in time it would have undermined the general resistance and the specific resistance to tuberculosis and caused an increase in the activity of the tuberculous infection, and that appropriate autogenous vaccine treatment was the best method of dealing with it; while in the second series of cases, although the bacteriological findings of the sputum were similar to the first series, there was no definite evidence that it was this infection, rather than the tuberculous infection, which was causing the pyrexia, and that, at any rate, it was not amenable to vaccine treatment.

Apparently we may expect to find much the same bacteriological content in any purulent sputum from a patient with an extensive lesion, and no conclusions can be drawn from this alone as to the importance of the secondary infection, which must be estimated mainly from the clinical data. It is interesting to note that vaccine treatment, whether successful or not, although followed by diminution or disappearance of sputum in some cases, did not materially alter the bacteriological content of the sputum if it still persisted.

Bacteriological Examination of Sputum.

A suitable method had to be found whereby accurate bacteriological examination of sputum could be made. Prof. L. S. Dudgeon very kindly gave me full particulars of a method which he had been using for some time which had given very satisfactory results, and this method was used in practically all cases.[1]

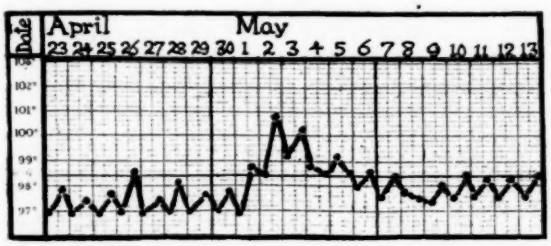
All the work was done inside a large glass box provided with silk side curtains and armholes, serving as a protection to the worker and also a preventer of air-borne contamination. Morning sputum was collected, with precautions to avoid contamination &c., and spread on a sterile tile of unglazed porcelain, 3 in. by 3 in. This was left for 20 minutes, scraped off in a viscous condition, respread on a second tile, and left till dry and powdery. Two casein-digest or meat agar-digest plates, adjusted to an alkalinity of pH 7·6, to which a small quantity of fresh human blood had been added, were prepared, and some of the powdery sputum was taken on the point of a knife, shaken on to these plates, and distributed evenly over the surface with a sterile glass rod. These plates were examined after 24 hours and showed a fine growth of discrete colonies, easy to pick off for

[1] Urquhart: Journal R.A.M.C., March, 1922. Wordley: Journal of Hygiene, July, 1921.

examination and subculture. A detailed examination was made of all the different micro-organisms growing, with a note as to the relative quantities of each, and from the first plate the composition of the proposed vaccine was determined. The only drawback experienced in using this method was the difficulty during the summer of excluding air-borne contamination, which probably occurred during the exposure of the sputum while drying on the porcelain tiles. The micro-organisms found were: (*a*) streptococci, (*b*) staphylococci, and (*c*) *Micrococcus catarrhalis*. These were present in various proportions in different specimens. It is interesting to note that in no case was the pneumococcus found, although the morphology of the micro-organisms forming some of the colonies suggested it, but these were always proved on subculture to be streptococci; I think it may be taken that the pneumococcus was not present, for Urquhart,[1] using this method and these media, obtained free growth of the pneumococcus in pulmonary infection, both acute and chronic. Friedländer's pneumo-bacillus, or any of the mucous-capsulatus group only appeared once; from previous experience of bacteriological examination of sputa in London I have seen this type of organism in three cases of pulmonary tuberculosis which responded to vaccine treatment.

A determination of the micro-organisms present in the specimen having been made, fuller attention was given to the streptococci as the most likely to be of importance in the secondary infection. These appeared to be mainly of two types: (1) long chains of coarse cocci, and (2) short chains of fine cocci. These could readily be recognised by the difference in their cultural characteristics. They were isolated

CHART 3.



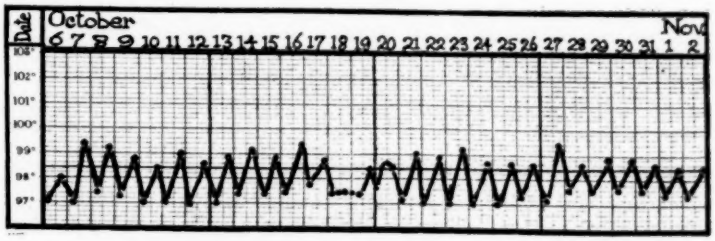
Showing a typical pyrexial attack. (Series 1, Case 2.)

and tested for hæmolytic power and pathogenicity to guinea-pigs. Except in very few cases they proved to be non-hæmolytic when grown in peptone water with fresh human blood corpuscles added, even though they occasionally showed signs of hæmolysis in the original blood-agar plates, but this phenomenon was also noted with some of the *Staphylococcus aureus* colonies. They were non-pathogenic to guinea-pigs (intraperitoneal inoculation) in all cases. Some strains were injected into rabbits intravenously and produced no effects.

Preparation of Vaccines.

The vaccines were first prepared by using a 24-hour broth culture, centrifugalising, washing, and re-emulsifying the organisms, and killing them by heat. Of these vaccines the dosage used was small, beginning at 5 million and working up to 50 million. Latterly I have used a method suggested to me by Prof Dudgeon, in which the vaccine is prepared by washing the culture grown on agar slopes with 1 per cent. formalin in normal saline solution, allowing the formalin to kill the micro-organisms, counting, and making a suitable dilution from this. Vaccines prepared by this method are capable of being used in much larger doses, beginning at 50 or 100 million and working up to 500 or 1000 million. The details of the two series are given in the accompanying tables, setting forth the type

CHART 4.



Case of pyrexia unaltered by vaccine. (Series 2, Case 2.)

of case, the type and dosage of the vaccine, and the course of the case after vaccine administration.

The size of the initial dose depended on the method of preparation. Injections were given every five to seven days provided that there was no fever and no premonition of a pyrexial attack. The dose was gradually increased and reactions were avoided as far as possible. If reactions occurred the vaccine was not given until this had entirely subsided and recommenced at a smaller dose and increased more gradually. If a case improved under treatment and relapsed, treatment was begun again. About three or four months' duration of treatment was aimed at, but unfortunately this was often curtailed by the patient having to leave the sanatorium. The ordinary sanatorium routine treatment was not modified during the vaccine treatment, the patients being put through such a course of graduated labour as their condition warranted.

The results of treatment of tuberculous patients of the working class in London, from which class these patients came, are influenced strongly by so many personal, social, and economic factors that I am doubtful whether any very valuable conclusion can be drawn from the history of the cases after their return to ordinary life. The results would be certainly disappointing, and I think they can only be relied on for patients of this class while the patients are under institutional conditions.

I wish to record my indebtedness to the Medical Research Council, with whose help this work was carried out; to Prof. Dudgeon, for advice and help throughout; and to Mr. L. G. Wilson, for his many months of assistance in the laboratory.

INFANT CARE.—A course of advanced lectures on Infant Care for infant welfare workers, teachers, and mothers will be held at 117, Piccadilly, London, W. 1, on Mondays, from 6 to 7 P.M., from Jan. 22nd to Feb. 26th, and at the Infants Hospital, Vincent-square, Westminster, London, S.W., from March 5th to April 23rd. The first half of the course will be given by Dr. H. C. Cameron and the second half of the course by Dr. Eric Pritchard.

LONDON INTER-COLLEGIATE SCHOLARSHIPS BOARD. Twenty-three scholarships and exhibitions of an aggregate total value of about £3035, open to men and women, and tenable in the faculties of arts, science, medical sciences, and engineering of University College, King's College, East London College, and Bedford College will be offered for competition on May 1st. Fifteen medical entrance scholarships and exhibitions of an aggregate total value of about £1530, tenable in the faculty of medical sciences of University College and King's College, and in the medical schools of Westminster Hospital, King's College Hospital, University College Hospital, the London (R.F.H.) School of Medicine for Women, and the London Hospital will be offered for competition on June 26th. Full particulars and entry forms may be obtained from the Secretary of the Board, Mr. S. C. Ranner, Medical School, King's College Hospital, Denmark Hill, London, S.E. 5.

SULFARSENOL IN THE TREATMENT OF SYPHILIS

AND OF SOME OF THE COMPLICATIONS OF GONORRHŒA.

BY F. CARMINOW DOBLE, M.R.C.S. ENG.,

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SINCE my last article on Sulfarsenol appeared in THE LANCET over two years ago,[1] the medical press in America and practically every country in Europe has published the result of the treatment of syphilis by this drug, but the English medical press has been almost silent on the subject.

Therapeutic Action.

Very few experts will disagree with the statement which has always been maintained by Colonel L. W. Harrison, that the therapeutic effect of any of the arsenobenzol group is always better when given intramuscularly or subcutaneously, than when the same dose is given intravenously. The only one of the arsenobenzol compounds at present on the market which can be given by injection into the muscles or subcutaneous tissue without causing great pain is sulfarsenol. Besides the increased therapeutic effect, there is no need for the patient to starve before an injection can be given. This starvation, besides being objected to by the patient, also renders him more liable to jaundice. The results which many others besides myself have obtained with sulfarsenol have been uniformly good.

Effect of Sulfarsenol on Spironema Pallidum.

The disappearance of *Spironema pallidum* from the lesions, as shown by the dark ground examination 24 and 48 hours after an injection of this drug, compares very favourably with intravenous injections of the same dose of neosalvarsan and neokharsivan. This was not my experience in the few cases I had treated, when I wrote my last article, but possibly the potency of the drug may have been increased in the meanwhile. In only one case was the spironema found on the third day.

Effect of Sulfarsenol on the Complement-fixation Test.

The clinical results and the effect on the complement-fixation test of the blood equals those of any other drug. The action on the cerebro-spinal fluid is not so marked as that obtained by silver-salvarsan. Even most of those cases whose blood shows what Colonel Harrison calls "an inveterate Wassermann reaction" can in time be made to give a negative result.

Sulfarsenol Treatment in Cases that React Badly to other Forms of "914."

I have treated a dozen or more cases who have reacted badly to the other arsenobenzol compounds, and who have been refused treatment by syphilologists on account of dermatitis, jaundice, or other complications. These unfortunate individuals could only get treated with potassium iodide and mercury. By starting with small doses of sulfarsenol and gradually increasing the dose, I found that the lesions cleared up and the complement-fixation test became negative and remained so. One of these cases had been taking mercury for over a year and still had moist papules on his scrotum. His mouth was in a dreadful state from mercurial stomatitis. He was in a suicidal frame of mind until his lesions rapidly cleared up and he realised that he was being cured.

Clinical Side Effects.—A Herxheimer reaction occurred in under 1 per cent. of all the cases. It was never severe and, apart from two instances, was only found in cases of advanced secondary syphilis with a well-marked rash, treated with an intravenous injection. These two instances occurred after a subcutaneous injection. I have never seen any clinical side effects, and have only heard of one, that was a slight vasomotor disturbance which took place shortly after an intramuscular injection. It only lasted a few seconds and never occurred again, although larger doses of the same batch were given subsequently.

Treatment of Infants and Pregnant Women.—In the treatment of infants there is no drug to touch sulfarsenol. Full courses can be given without fear of severe consequences or fatal results, as long as the dose is regulated by the body-weight of the infant. Pregnant women can be treated right up to the birth of the child, and then mother and child can be treated separately.

Cause of Pain after Injections.—Some batches give more pain than others, but it is never very severe. The distilled water that the drug is dissolved in must be absolutely fresh and sterile. The water is to blame in cases with high temperature and with the great pain sometimes complained of in the site of the injection.

Routes of Injection.

It seems quite unnecessary to give intravenous injections of sulfarsenol in the treatment of syphilis, a larger dose has to be given, the patient has to starve before, and starve and rest after each injection;

Primary Cases.

Case.	Description.	Date of injection.	Dose.	W.R.
1 1921	Indurated frenal chancre. Inguinal adenitis double plus. No other signs. (W.R. neg. after 3·24 g. S. and 0·45 g. NAB.)	April 28	0·45 NAB (Iv)	+ +
		May 4	0·42 S	+ +
		,, 11	0·6 S	+ + +
		,, 18	0·6 S	+ + +
		,, 25	0·6 S	+ + +
		June 1	0·6 S	±
		,, 8	—	+ +
		,, 29	0·42 S	+ +
		July 6	0·6 S	—
2 1921 and 1922	Papulo-erosive ulcer prepuce. Slight inguinal adenitis. No other signs.	June 22	0·45 NK (Iv)	—
		,, 29	0·42 S	—
		July 6	0·6 S	—
		,, 13	0·6 S	—
		,, 20	0·6 S	—
		,, 27	0·6 S	—
		Aug. 24	0·42 S	—
		,, 31	0·6 S	
		Sept. 7	0·6 S	
		Oct. 26	0·42 S	—
		Nov. 2	0·6 S	
		,, 9	0·6 S	
		,, 16	—	—
		Dec. 19	—	—
		Jan. 23	—	—
		May 17	—	—
3 1921	Indurated chancre glans penis. Inguinal adenitis right side. No other signs. (W.R. neg. after 1·02 g. S. and 0·45 g. NK.)	April 27	0·45 NK (Iv)	+ +
		May 4	0·42 S	+ +
		,, 11	0·6 S	+ +
		,, 18	0·6 S	—
4 1921 and 1922	Indurated mental sore. Inguinal adenitis double plus. No other signs. (W.R. neg. after 3·06 g. S.)	Mar. 30	0·42 S	+ +
		April 2	0·42 S	
		,, 6	0·42 S	+ +
		,, 13	0·6 S	+ +
		,, 20	0·6 S	+ + +
		,, 27	0·6 S	+ +
		May 4	0·6 S	—
		June 8	0·42 S	—
		,, 15	0·6 S	—
		,, 22	0·6 S	—
		July 20	0·42 S	—
		,, 27	0·6 S	—
		Aug. 3	0·6 S	—
		,, 10	—	—
		May 5	—	—
5 1921 and 1922	Two indurated sores preputial orifice. Inguinal adenitis right side. No other signs.	June 13	0·45 NS (Iv)	—
		,, 20	0·42 S	—
		,, 27	0·6 S	—
		July 4	0·6 S	—
		,, 11	0·6 S	—
		,, 18	0·6 S	—
		Aug. 22	0·42 S	—
		Oct. 24	0·42 S	—
		Nov. 7	0·6 S	—
		Feb. 6	—	—

Dark-ground *S. pallidum*.—Cases 1 and 2: Present 24 and absent 48 hours after first injection. Case 3: Abundant. Present 24 and absent 48 hours after first injection. Cases 4 and 5: Abundant. Absent 24 hours after.

W.R. = Wassermann reaction. S = Sulfarsenol. NAB = Novarsenobillon. NK = Neokharsivan. NS = Neosalvarsan. Iv = Intravenously.

[1] THE LANCET, 1920, ii., 243.

Secondary Cases.

Case.	Description.	Date of injection.	Dose.	W.R.
1 1921 and 1922	Indurated granulomatous sore penis. Inguinal adenitis double plus. Roseolar syphilide. (W.R. neg. after 3·66 g. S.)	Mar. 7	0·42 S	+ +
		,, 10	0·42 S	
		,, 14	0·42 S	
		,, 21	0·6 S	+ +
		,, 30	0·6 S	+ +
		April 6	0·6 S	+ +
		,, 13	0·6 S	+ ±
		May 18	0·42 S	−
		June 1	0·6 S	−
		,, 18	0·6 S	
		July 18	0·42 S	−
		,, 25	0·6 S	−
		Feb. 15	—	−
		Mar. 20*	—	±
		June 1	—	−
2 1921 and 1922	Indurated mass coronal sulcus. General adenitis. Recurrent roseolar syphilide and annular papular syphilide. (W.R. neg. after 3·66 g. S.)	April 11	0·42 S	+ +
		,, 14	0·42 S	
		,, 18	0·42 S	+ +
		,, 25	0·6 S	+ +
		May 2	0·6 S	+ +
		,, 9	0·6 S	+ +
		,, 23	0·6 S	+ +
		Mar. 3	—	−
		,, 10	0·42 S	
3 1921 and 1922	Papulo-erosive sore corona. General adenitis. Follicular pustular rash. Impetiginous crusts scalp and scrotum. Tonsils ulcerated. (W.R. neg. after 2·46 g. S.)	Oct. 20	0·42 S	+ +
		,, 24	0·42 S	
		,, 28	0·42 S	
		Nov. 4	0·6 S	+ +
		,, 11	0·6 S	±
		,, 18	0·6 S	±
		,, 25	0·6 S	−
		Mar. 24	0·42 S	
		,, 31	0·42 S	
		April 7	0·42 S	
		,, 13	0·6 S	
		,, 21	0·6 S	
		,, 28	0·6 S	
		May 5	0·6 S	
		,, 12	—	−
4 1921 and 1922	Healed indurated chancre coronal sulcus. General adenitis. Papular crustaceous syphilide. Papules scrotum and moist papules tongue. Erythematous recurrent syphilide flanks. (W.R. neg. after 0·45 NK and 3·22 g. S.)	June 20	0·45 NK (Iv)	+ ±
		,, 27	0·42 S	+ +
		July 4	0·6 S	+ ±
		,, 11	0·6 S	+ ±
		,, 18	0·6 S	+
		,, 25	0·6 S	+ ±
		Aug. 8	—	±
		,, 29	0·42 S	
		Sept. 5	0·42 S	
		,, 12	0·6 S	
		,, 19	—	−
		Oct. 10	0·42 S	
		,, 17	0·6 S	−
		,, 24	0·6 S	
		,, 31	—	−
		Mar. 13 to June 9	3·66 g. S.	
		June 16	—	−
5 1921	Primary granulating sore gluteal fold. General adenitis. Papular rash. Moist papules penis. Pharyngitis. (W.R. neg. after 0·45 NAB and 2·82 g. S.)	Aug. 10	0·45 NAB	+ +
		,, 17	0·42 S	
		,, 24	0·6 S	
		Sept. 7	0·6 S	
		,, 14	0·6 S	
		,, 21	0·6 S	+ +
		,, 28	—	±

Dark-ground *S. pallidum*.—Case 1: Present. Absent 24 hours later. Case 2: Present 24 and absent 48 hours after first injection. Case 3: Absent. Case 4: Abundant. Present 24 and 48 hours later. Case 5: Present. Absent after.

* Then had 3 × 0·42 g. S., 4 × 0·6 g.

this is bound to interfere with his or her work, and possibly results in the treatment being interrupted or even stopped altogether. With the other methods of injection, especially the subcutaneous, the patient is able to carry on his ordinary work without the fear of anything untoward happening. Any form of exercise can be taken directly after an injection.

Results of Treatment.

The accompanying notes on five cases of primary and five of secondary syphilis show the result of treatment by sulfarsenol. Space limits the details, but they are enough to give a very good idea of the therapeutic effect of the drug. In tertiary syphilis the results are equally good, but again space precludes one from showing them in this article. It will be seen that in some of the cases a preliminary intravenous injection of neosalvarsan, neokharsivan, or N.A.B. has been given. This was done with the idea of rendering the patient non-infectious in the quickest possible time. It now appears evident that sulfarsenol has quite as lethal an action on the spironema as any of the other arsenobenzol compounds used. All the injections were given by the intramuscular route, unless otherwise stated. The cases that only had a few injections were either transferred to another hospital or were demobilised and instructed to attend a civil clinic. All cases were treated concurrently with intramuscular injections of mercury.

It will be seen from the following table what is the effect on the Wassermann reaction on cases of primary and secondary syphilis after the first course of 4·2 g. sulfarsenol. The total number of cases of which I could obtain the figures was 230.

—	W.R. − before treatment.	W.R. + before treatment.	W.R. + after 4·2 g.
Primary ..	60 per cent.	40 per cent.	0
Secondary ..	0	100 per cent.	12·5 per cent.

The Complications of Gonorrhœa.

For the treatment of the complications of gonorrhœa the intravenous route is the best. I have tried this drug on patients with most of the complications that are to be met with, such as arthritis, rheumatism, hyperkeratosis, and epididymitis. The results were remarkably good, but the effect in epididymitis was extraordinary. I have treated nearly 300 cases of this complication with sulfarsenol, and have never failed to stop the pain in a few hours and reduce the temperature and swelling in a few days, the average time in bed being 4·5 days. Patients previously in very great pain who had to be given morphia, slept peacefully a few hours after an injection of sulfarsenol. It has been my custom to give a dose of 0·12 g., followed in 48 hours by an injection of 0·18 g. In all but four cases no more injections were necessary. In these cases the temperature went up a day or so later, and the pain returned. I then gave an 0·18 g. followed by another injection 48 hours later of 0·3 g., with the result that the temperature dropped to normal and the pain disappeared. They did not relapse again. (See chart.) These cases of epididymitis were free from gonorrhœa in the average number of days of cases with no complications.

All the cases were treated either privately or at the Military Hospital, Rochester-row. For permission to publish the results of the hospital cases my best thanks are due to the commanding officer, Major A. T. Frost, and also to Major G. Petit, officer in charge of the syphilis division.

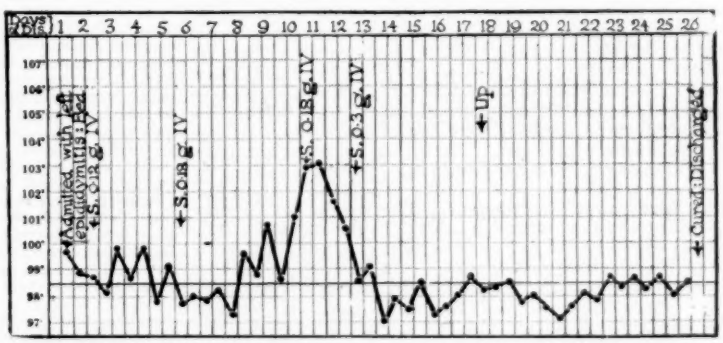

Chart showing temperature of case requiring more than two injections of sulfarsenol. After two further injections the temperature fell to normal and the pain disappeared. No relapse followed. IV = Intravenous.

THE NON-DIARRHŒIC TYPE OF CŒLIAC DISEASE:

A FORM OF CHRONIC FAT-INDIGESTION IN CHILDREN.

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WITH

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THE objects of this communication are, first, to describe a group of young children who show certain symptoms and who fail to thrive owing to an inability properly to absorb their dietetic fat, and yet who differ from the ordinary cases of cœliac disease in that they show neither pallor of the stools nor (in its popular sense) diarrhœa; secondly, to give the evidence for regarding them, in spite of these notable differences, as examples of cœliac disease in mild form; and finally, in the light of these cases to offer some comments on the characteristics of fatty stools in general and on the pallor of cœliac stools in particular.

To refer for a moment to the terms of my title, I mean by "cœliac disease" a disorder showing as its essential feature malabsorption of fat, which disability is not referable to gross disease of the pancreas, liver, or intestine. I have elsewhere produced evidence to show that the "disease" is, as Gee and others conceived it to be, essentially a digestive fault and not an organic disease.[1] The term diarrhœa is used in its popular meaning of loose and frequent stools, and not in the stricter sense of merely excessive intestinal elimination; the latter is present in the group of cases I am describing.

Classical (Diarrhœic) Type of Cœliac Disease.

The symptoms of cœliac disease usually make their appearance first in the second year of life and often develop rapidly. In classical form they consist of (1) enlargement of the abdomen without signs of organic abdominal disease; (2) the passage of stools which are large, pale, unformed, obviously fatty, very offensive, and more frequent than normal, the diarrhœa at times being very severe and leading to grave illness and wasting; (3) on analysis the percentage of fat in the fæces is found to be very much above the normal for the child's age and diet, such figures as 30, 50, or even 80 per cent. being obtained; and the fæcal fat is thus distributed: fatty acid in greatest excess, soaps in considerable excess, and neutral fats in small proportions only; (4) retardation of physical development. To these most important symptoms may be added as frequently present (5) fickleness of the appetite with periods of refusal of food; and (6) some persistent low fever or bouts of rather higher temperature.

Non-diarrhœic Type of Cœliac Disease.

The non-diarrhœic form resembles the classical type in most particulars, but it must be emphasised that it resembles (and, indeed, constitutes) a *mild* variety of the disorder. Thus it appears to start at about the same age, but it develops so insidiously that its onset is dated with difficulty. The abdomen is enlarged, definitely but so moderately that it may be regarded as a peculiarity of the child rather than as an indication of disease. There may be some retardation of growth, or, more commonly, merely a failure to gain any weight even for months at a time. Anorexia and fever may be present. The stool, as in the ordinary type, contains a considerable excess of fat, but in appearance and composition it is very different from the classical cœliac stool. In both types of the disorder the stool is large, but in the non-diarrhœic type it is formed, well-coloured (and the colour deepens on exposure), and not particularly offensive. In frequency there may be one, occasionally two, daily. The size of the stool is increased because it contains an abnormal amount of fat (20–50 per cent.). The difference in its appearance from the classical cœliac stool seems due to a difference in the distribution of the fæcal fat; for, instead of the greatest proportion of the fat being in the form of fatty acids, showing as masses of white crystals under the microscope, in the non-diarrhœic type the fat is chiefly in the form of soaps which show microscopically as pigmented flakes. Thus in this type of the disorder, although on very close examination a cut surface of the fæces may appear greasy in texture and perhaps rather grey in colour, the stool as a whole on ordinary inspection looks very normal in consistency and colour though rather large in size. It will be argued later that the soaps take up the bile-pigment rendering the stool coloured, whereas in the presence of a great excess of fatty acids the pigment is masked.

Table of Comparison between the Classical and Non-diarrhœic Types of Cœliac Disease.

—	Ordinary type.	Non-diarrhœic type.
Onset.	Rapid.	Insidious.
Symptoms.	Severe.	Mild.
Stools.	Very large.	Large.
	Unformed.	Formed.
	Very pale.	Well coloured.
	Offensive.	Not offensive.
	Obviously fatty.	Greasy on section.
Fæcal fat.	Frequent (2–8).	Not frequent (1–2).
	Great excess (30–80 %)	In excess (20–50 %).
	Mainly fatty acids.	Mainly soaps.

Cases of Non-diarrhœic Type.

The following are cases of non-diarrhœic type:—

CASE 1.—Molly C., aged 4 years, referred to me by Mr. G. Elphick for attacks of fever. One year ago her tonsils were removed for local reasons. Three months later she had a bad cold in the head which was followed by attacks of fever lasting from three to five days, and starting off with a temperature of 103° F. After three months of these attacks she was found to have a chronic streptococcal maxillary antrum. This was drained and for the next three months no febrile attacks occurred. However, for the last three months they had again been present and at the time of my first seeing the child they were occurring about every three weeks. They were not accompanied by either constipation or diarrhœa, but they were preceded by a day or so during which the child appeared sallow, refused her food completely, and had a coated tongue. No cause for these febrile attacks could be traced. During the last six months she had lost weight (3¼ lb.) and had ceased altogether to grow.

Condition on Examination.—On seeing the child I was at once struck by her doll-like appearance. In weight she was 34 lb., and in height 40 in., but she looked more *petite* than these figures suggest. Her abdomen was distinctly large, showing particularly when she stood up, and I was told that it had "always" been so; at all events, at the age of 2 it was definitely prominent. The lack of growth, the enlargement of the abdomen, the very poor appetite with periods of refusal of food, and the attacks of unexplained fever together made me consider the possibility of cœliac disease. I went, therefore, carefully into the question of the stools but could obtain no history of diarrhœa or pale stools at any time. On the other hand, the statement was volunteered that the stools were always large and would remain so even after a day in which almost no food was taken. The bowels were opened once every day without fail; very occasionally twice. Before inspecting the stool I inquired into the diet. Several diagnoses had been made on the case, ranging from hysteria to abdominal tuberculosis, and on the latter hypothesis the diet at that time, in addition to ordinary food in as large quantities as the child could be prevailed upon to take, contained milk and cream from a Jersey herd on the parents' estate, and also cod-liver oil. Yet the stool was perfectly formed and quite good in colour.

Fat Analyses.—Considering the diet I felt that the appearance of the stool quite negatived the possibility of cœliac disease in such a stage as to be productive of symptoms. But when the fæces were being manipulated for the purpose of a bacteriological examination it seemed that they were rather greasy and under the microscope many coloured flakes of soaps were seen, so that an analysis for fat was made. This showed no less a proportion of fat than 56·8 per cent., of which 57 per cent. was in the form of soaps. Protein digestion was good, and there was no evidence of catarrh or inflammation of the bowel. The bacteria were normal, mainly coliform organisms with a few streptococci. No other possible cause for pyrexia could be found, but I did not yet feel certain that the diagnosis of cœliac disease was

correct. I remembered that I was seeing the child during an apyrexial period and that the amount of the fat in the diet was very excessive. I therefore had another analysis made when the cream and cod-liver oil had been omitted from the diet. The percentage of fat in the stools only sank from 56·8 per cent. to 52 per cent. (analysis B). This looked still more suspicious. I therefore had all milk skimmed by hand (gravity method) and all butter omitted from the diet. This brought the percentage of fat in the fæces down to 34 per cent. (analysis C). This high percentage on a low fat diet I considered diagnostic, and this opinion was confirmed by the improvement in the child's complexion, spirits, and appetite, and by the cessation of the feverish attacks.

Result of Treatment.—Proceeding then to find her optimum diet in fat, I had all her milk machine-skimmed. The percentage of fat in the stool dropped to 28 per cent. and the administration of bile-salts reduced it further to 24·8 per cent. (analyses D and E). Further improvement was shown in the appetite and in every way the child seemed extraordinarily better. But on this diet she lost a little weight. Some more fat was therefore added to the diet and weight was gained (analyses F and G). During the ten months of treatment the child's improvement has been remarkable and is steadily maintained. There have been no febrile attacks at all. She has gained 5¼ lb. in weight and has grown 3 in. She now eats with relish and mentally has altered into a bright cheerful child. In January, 1923, the stool contained 22% of fat, of which 70·9% was in the form of soap.

CASE 2.—C. B., aged 2¼ years, daughter of a colleague. She was well and strong until 20 months, when she had a feverish attack with greenish, frequent stools, lasting about four days. Since then she has lost her appetite, the abdomen has become big, and for a year she has gained no weight at all and has now stopped growing. She has had three other feverish attacks, one accompanied by a convulsion. The explanation of these attacks has appeared quite obscure. Her appetite is now extremely bad, she chews but will not swallow; a meal will take up to two hours; she will not touch fish, chicken, or meat. The stools are large, one a day, and well coloured. On analysis on ordinary diet, containing 1¼ pints of milk, they were found to contain 31·2 per cent. of fat (analysis A). On diets containing modified amounts of fat they contained 14·7 per cent. and 21·2 per cent. (analyses B and C).

This patient has only been under treatment for six months. It has been instructive to note how regularly any excess of fat in the diet has been accompanied by increase in the size of the abdomen and a complete loss of appetite. After some six weeks of feeding on a very low fat diet the appetite improved wonderfully, and meat and fish are now taken for the first time in the child's life. The administration of bile-salts here seems to have helped the appetite. Growth has restarted (1¾ inches in height and much weight have been gained).

CASE 3.—Male, aged 7, sent to me by Dr. Hunter Dunn. The boy had no definite symptoms except that he was not developing well and was extremely tiresome over his food. He had been diagnosed in Ireland as suffering from rickets and hypothyroidism, and was taking thyroid. I could find no evidence of these conditions except that his abdomen was definitely large and was stated to have been always so. I suggested that the thyroid should be omitted (in agreement with Dr. Dunn) and that the stools be carefully watched for any pallor or signs of excessive fat. After a month I saw the patient again, and in spite of the absence of any naked-eye abnormalities of the stool I had an analysis made for fat. This showed 27·2 per cent., an excessive amount for an ordinary mixed diet. In this case there was no history of diarrhœa or pale stools at any time.

CASE 4.—Male, aged 9, also referred to me by Dr. Hunter Dunn. The prominent symptom here was unexplained fever. Five months previously he had had influenza, and on recovery of his usual health it was found that his temperature remained between 99° and 100°. At times he becomes dark round the eyes and his tongue gets coated, but he does not suffer from constipation or diarrhœa. No signs of disease could be found anywhere, but it was noticeable that his abdomen was definitely large. On analysis of his stools the proportion of fat in the dried fæces was found to be 22 per cent., of which 56·4 per cent. was in the form of soaps.

This case seems less definite than the preceding one, but I am inclined to think it is a very mild example of the non-diarrhœic type. I advised that the use of the thermometer be stopped and that should any worse symptoms develop the fat in the diet be reduced. If the condition of the temperature be disregarded the boy has continued in very good health.

CASE 5.—Male, aged 6, seen with Dr. P. Bott. Child has always been thin and has had a large abdomen since he was 2 years old. His appetite is persistently poor; he is very slow over his food and at time eats very little. His physical development has been slow. His stools are always rather large, but he is not subject to diarrhœa. He has never passed pale stools. Six weeks before I saw him he had had an attack of diarrhœa with fever in Athens, and since then his condition has been less satisfactory than before. His stools are very large but of good colour; the abdomen is definitely large. The stool showed very numerous cysts of *Lamblia intestinale*, but the bacteria were normal. On a mixed diet with one pint of milk the percentage of fat in the fæces was 24·8, of which 67·8 per cent. was soaps. In the absence of any other digestive disturbance this proportion of fat in the stool is distinctly suggestive.

Table of Analyses of Fæces in the Five Non-diarrhœic Cases of Cœliac Disease.

Case.	Analysis.	Per cent. fat in fæces.	Per 100 g. of fæcal fat.		
			Neutral fat.	Fatty acids.	Soaps.
1	A.	56·8	14·1	28·9	57·0
	B.	52·0	13·1	40·8	46·1
	C.	34·0	14·1	21·2	64·7
	D.	28·0	15·1	42·1	42·8
	E.	24·8	16·2	40·3	43·5
	F.	26·8	9·0	40·3	50·7
	G.	34·3	3·1	42·6	54·3
2	A.	31·2	8·9	32·1	59·0
	B.	14·7	23·1	29·2	47·7
	C.	21·2	9·5	37·7	52·8
3	—	27·2	5·9	29·4	64·7
4	—	22·0	7·3	36·3	56·4
5	—	24·8	9·6	22·6	67·8

Evidence for Including these Cases as Cœliac Disease.

Although it has been noted by S. Gee and G. F. Still[3] that the development of cœliac symptoms may be preceded by constipation, yet, so far as I know, a positive diagnosis of the disease has always rested upon the occurrence of the classical cœliac stool, pale, unformed, and frequent. In the present group of cases this characteristic feature is entirely absent, and the question arises whether it is proper to class the non-diarrhœic cases as examples of cœliac disease. As this malady cannot be identified by any specific morbid anatomy or histology [2] the only evidence by which I can support my thesis is necessarily of an indirect kind.

(*a*) *General Similarity.*—The symptoms in the non-diarrhœic form are similar to those of the classical type, though less severe in grade. In my view the essential feature of the disease is the conspicuous failure to absorb fat, a failure out of all proportion to any other impairment of digestion. If this be allowed, then the non-diarrhœic type is essentially the same malady as the diarrhœic cases. In both there is the excessive fat-loss in the stools, the failure to thrive and develop, the enlargement of the abdomen without signs of organic disease, the perversion and loss of appetite, and the tendency to pyrexia. But this similarity depends upon the recognition of the fact that an excessive fat-wastage may be present in the absence of diarrhœa or pallor of the stools. The difficulty that may thus arise in diagnosis is well illustrated in the first case quoted above.

(*b*) *Consideration of Quiescent Stages of Classical Type.*—Further evidence is afforded by the consideration of the diarrhœic cases in their quiescent or convalescent stages. From this two facts emerge: first, that in the non-diarrhœic stages of cases which may have shown typical diarrhœa alba for years, the stools still contain a large excess of fat, mainly in the form of soaps—that is, they are exactly similar to those found throughout in the non-diarrhœic type which I am describing; second, that, contrary to what is usually held to be the case, the disappearance of the classical pale stools by no means indicates that the disease has "cleared up," for analysis will still show a great impairment of fat-absorption. These two important facts are demonstrated in the following cases, the first of which is of considerable interest to me, as it was the first case in which I realised that a stool might be hard, dark, and constipated and yet contain a great excess (39·6 per cent.) of fat.

CASE A.—G. W.,[2] born October, 1909; first seen April, 1920. From the age of 2 until January, 1920, had suffered from typical pale diarrhœa. She could not walk until 4 years old. Has grown little and for three years not at all. Her abdomen has been very large throughout. Since January, 1920, there has been no more diarrhœa, the stools being dark and formed and only one daily. During this time she has improved in every way and growth has restarted. When first seen she was well nourished, but 6 inches below the height proper for her age; in dentition she was two years behindhand; her abdomen was still large. When I first saw her I determined to await a fresh attack of diarrhœa before getting the stools analysed, but none supervened. After waiting nearly a year an analysis was made—i.e., 15 months after the cessation of all symptoms. The report of the stool was as follows:—March, 1921: Stool is very dark brown, hard, and formed; fat in fæces, 39·6 per cent. (neutral fat, 7·0; fatty acids, 28·3; soaps, 64·7 per cent.). During this period of observation, and since, progress has been in every way satisfactory on a slightly low-fat diet. In two years she has grown 6¼ inches.

CASE B.—Doris F.,[1] born October, 1911. This case up to January, 1920, has already been reported. She had suffered from typical cœliac diarrhœa since the age of 2 and has been under my observation since she was 3. At 7 she developed late rickets. In January, 1920, her weight was 24 lb. 6 oz. (normal for age 52 lb.) and height 36½ in. (normal 47 in.). At that time she was given a constant diet containing about 25 g. of fat, and analyses were made of the stools before and after the administration of bile-salts (analyses A and B). Since this time progress has been vastly better and since September, 1920, there has been no diarrhœa at all. Her appetite has greatly improved and there has been good development. In September, 1922, her weight was 47½ lb. and height 42½ in. Nevertheless analyses made March, 1921, and June, 1922 (analyses C and D) show still a considerable excess of fat in the stool mainly in the form of soaps.

Analyses, Case B.

Analysis.	Per cent. fat in fæces.	Per 100 g. fæcal fat.		
		Neutral fat.	Fatty acids.	Soaps.
A	52·4	15·3	75·4	9·3
B	33·7	7·7	49·3	43·0
C	26·8	8·9	37·4	53·7
D	33·2	7·2	40·9	51·9

CASE C.—John R., born April, 1908. Severe cœliac symptoms since the age of 18 months leading to diminished growth. During the last few years has made better progress than previously. For the last two years has been at boarding-school on an ordinary diet and has kept free of diarrhœa, and the stools are persistently well coloured. Growth has been resumed and is at the rate of rather more than 2 in. yearly. An analysis of the stool made in April, 1921, shows still some excess of fat, mainly in the form of soaps. Fat in fæces, 22·8 per cent. (neut. fat, 17·5; fatty acids, 24·6; soaps, 57·9). He has now passed into a public school.

CASE D.—Albert C.[1]; case previously published in detail. Analyses were made on various diets during a time when the stools were coloured and formed. The percentage of fat in the fæces was above the normal (average of four analyses, 27·1 per cent.) and the proportion of soaps high (average 66·7 per cent. of fæcal fat). For the last two years he has kept perfectly well, having grown 6 in. and gained 8½ lb.

(*c*) *Consideration of the Variation in Cœliac Stools.*—Going a step further we gain some information on the matter in hand by considering the variations which occur in cœliac stools from day to day. It is no uncommon thing to be able to note in a case of cœliac disease that the stool one day is pale and unformed, and the next is formed and coloured. This may occur even on a diet containing a constant amount of fat. Indeed, I have several times seen a stool of which the first portion passed is hard and coloured and the latter part pale and "porridgy." For a long time these variations puzzled me, as they cannot well be explained on the supposition that the colour and consistency of the stool depend entirely either on its fat-content or the bile-flow. I have therefore come to think that these variations depend largely upon the distribution of the fats present in the stool; where the proportion of soaps is high the fæces will be coloured, but where the fatty acids are chiefly in excess the characteristic cœliac pallor will be present.

Summary.—My contention that these non-diarrhœic cases are true instances of cœliac disease has been supported by two main lines of argument. First, I have demonstrated that in them, as in the classical type of the disorder, the essential feature is the excessive fat-wastage in the stools. Secondly, I have shown that cases of the classical form of the disease, during their most favourable phases, pass stools which in appearance and on analysis are exactly similar to those passed by the non-diarrhœic cases throughout their course. I therefore conclude that the cases here described are truly cases of cœliac disease in a mild but persistent form.

Diagnosis.

Once it is admitted that cœliac disease in mild form may exist without ever showing diarrhœa or pale stools, the chief difficulty in diagnosis consists in separating such cases from those of general enfeeblement of digestion. It is not easy to lay down any absolute rules in the matter, but if opportunities are given for watching any doubtful case for a while in time the true diagnosis can usually be made. There are suggestive features: 1. The abdomen is enlarged without positive evidence of organic disease; this enlargement varies in individual cases and tends to be at its worst in the evenings, being usually more noticeable when the child is standing than when it is lying down. 2. The appetite is nearly always very poor—there is a very characteristic difficulty in feeding cœliac children; the meals present a domestic problem which at its worst is most distressing. 3. Unexplained pyrexia may be present.

The diagnosis must ultimately turn upon the character of the stool in the presence of these suggestive symptoms. The most constant abnormality of all fatty stools is in their size. They are large for the size of the child and very large for the size of the appetite. A chemical analysis shows that the percentage of fat in them is above the physiological maximum considering the age of the patient and the dietary taken; and this excess of fat is present (in the non-diarrhœic type) without any other grave defect in digestion being noticeable on microscopical examination.

What, then, may we regard as the maximum physiological percentage of fat in the fæces of children? From my own experience I take 20 per cent. as the figure above which the proportion should not go in a child of 3 years or more on an ordinary mixed diet. For children between 2 and 3 years another 5 or perhaps 10 per cent. may be allowed as not abnormal. The diagnosis will be confirmed by watching the effect of treatment. With a reduction in the fat of the diet the child's abdomen will become less prominent, the appetite will usually improve, the patient's temper and spirits will alter for the better, and the stools will become obviously less bulky. Analysis will show that the percentage of fat in the fæces is much reduced but it will remain high for the small amount of fat in the diet.

Treatment.

The treatment of the non-diarrhœic cases follows the same lines as that of the classical type. In principle it consists in ascertaining the optimum intake of fat for the individual case—that is, the amount of fat upon which the child best gains weight and health. Experience teaches me that although there are wide variations between individual cases the best results are obtained when the fæces contain from 20 to 30 per cent. of fat. If the fat in the diet is unduly restricted the child will lose weight, but if too much is allowed the original symptoms will return.

The routine I at present observe is on the following lines:—

1. Analysis of the fæces for fat before altering the diet.

2. Rapid reduction of the fat in the diet to a minimum, hoping to see a reduction of all symptoms and an improvement in the appetite and general condition of the patient; and the ordering of an alkaline mixture of magnesia or rhubarb and soda with the idea

of aiding the saponification of fats in the intestine. In the diet for this stage all milk should be carefully skimmed. This is most thoroughly done by having the milk heated to 200° F. for 20 minutes and then left to stand for four hours. The cream thus clotted is carefully removed. Butter should be replaced by anchovy paste, potted meats, jams, syrup, or honey. Suet and meat fat are not allowed. The child may have eggs, lean meat, chicken, fish, tongue, vegetables, bread, and toast. The chief difficulty is over the puddings: milk pudding made with skimmed milk, boiled rice, sandwich and sponge-cake puddings, stewed fruit, cocoatina, and coloured jellies may be allowed. For drinks, skimmed milk flavoured with tea, cocoatina, or bovril may be given. After two or three weeks of this diet a second analysis is made which gives the minimum practicable percentage of fat in the case.

3. If there is a diminution in the symptoms but at the same time some loss of weight, more fat may be gradually introduced into the diet. The most welcome relaxation is "scrapes" of butter; then the milk may be skimmed more lightly or a little suet may be used in cooking. Each addition should be made separately and, if necessary, controlled by analyses.

4. When the diet seems the most suitable, as judged by freedom of symptoms and gain of weight, I order "kapsols," prepared for me by Messrs. Allen and Hanburys, containing ½ gr. each of sodium glycocholate and taurocholate, prescribing one or two after the three meals of the day to be taken with the alkaline mixture. If, without any alteration in the diet, the percentage of fat in the stools drops or constipation becomes troublesome some more fat may be permitted. I give courses of the bile-salts for alternate months.

5. During the alterations in the diet the child should be weighed every week and its height measured quarterly. It is useful to get the mother or nurse to keep notes on these points.

Characteristics of Fatty Stools.

The various types of fatty stools may be compared and contrasted in tabular form as follows:—

Stool.	Excess of fæcal fat.		
	Neutral fat.	Fatty acids.	Soaps.
Size	Large.	Large.	Large.
Formation	Unformed.	Unformed.	Formed.
Consistence	Oily.	Greasy.	Soapy.
Appearance	Pale.	Pale.	Coloured.
Homogenicity	Oil droplets or separated grease.	Homogeneous.	Homogeneous.
Offensiveness	Marked.	Marked.	Not marked.
Microscopically	Oil globules.	Masses of crystals.	Coloured flakes of soap.

The stools in all cases of excessive fat-wastage are larger than normal, but apart from their size their other characteristics depend upon the form in which the fat is chiefly passed ("fat-distribution"). Fat may be passed in the fæces mainly as unsplit (neutral, unchanged dietetic) fat, or as split fat (fatty acids and soaps). The characteristics of those containing the two forms of split fat have already been described, and it may be useful to contrast with them the stool containing an excess of neutral fat.

It is generally considered that the proportion of neutral fat in fæces should not exceed 25 per cent. of the total fæcal fat. A greater proportion than this is suggestive of failure on the part of the pancreatic lipase, and the stool indicative of pancreatic insufficiency is often very characteristic. It is very soft and oily and usually abnormally frequent. It is pale, although there is no obstruction to the flow of bile into the intestine. But the most characteristic feature is the occurrence of fat separated out from the fæcal material, either as oily droplets or larger areas of separated fat rapidly congealing on cooling (butterstuhle). To this phenomenon is applied the term of true or pancreatic steatorrhœa. This type of stool is never seen in cœliac disease. Here fat-splitting seems unimpaired. In one case under my care, although the percentage of fat in the stool was as high as 77·2 per cent., only 7·5 per cent. of the fæcal fat was passed unsplit.

On the Pallor of Cœliac Stools.

One of the views advanced to explain the pallor of the stool characteristic of cœliac disease has been that of deficiency of bile excreted into the intestine. Although various writers have issued warnings against the judging of the amount of bile in fatty stools solely by their colour, I do not know that anyone has definitely decided against this theory. In my own mind I have no doubt that bile-pigments pass freely into the intestine, and that the pallor of the stools is due not to their absence but to their being masked by the excess of fat, if present chiefly in the form of fatty acids.

My reasons for this belief are as follows: 1. Colour is quickly restored to the stools if the fat in the diet is rigorously cut down. 2. The appearance of coloured stools in the non-diarrhœic type of cœliac disease. 3. As mentioned above, the remarkable variations in the colour of the fæces from day to day even on a constant diet. 4. I have once seen a case of cœliac disease suffer from an ordinary attack of catarrhal jaundice. 5. It is not really possible to imagine the liver refusing to deal with blood-pigment for months at a time as we should have to do if we are to suppose that no bile-pigment is passed into the intestine. 6. In pancreatic steatorrhœa, although there is no interference with the bile-flow, the stools are pale owing to the masking of the pigment by the excess of fat. This was commented upon by T. J. Walker so long ago as 1889.[3]

On these grounds I therefore conclude that the pallor of the classical cœliac stool does not depend upon an absence of bile-pigment; but this statement must not be taken to imply that the action of the bile on fat absorption is unimpaired. There is no reason why the excretion of bile-pigment and the secretion of bile-salts should necessarily be so bound up together that one cannot be deficient without the other.

Summary and Conclusions.

1. A group of children who fail to thrive owing to their inability to absorb fat properly has been described and the principles of treatment for the condition discussed.

2. It has been shown that in spite of the absence of diarrhœa (in the popular sense of the word), and in spite of the absence of the typical pale, unformed, and stinking cœliac stool, this group is nevertheless cœliac disease in a mild form.

3. It is suggested that the group may be conveniently termed the "non-diarrhœic or dry form of cœliac disease."

4. It has been shown that a stool may contain a large excess of fat (even over 50 per cent.) and yet be formed and coloured if the fat in it is chiefly in the form of soaps; whereas, when chiefly in the form of fatty acids, the excess of fat causes the stool to be pale, unformed, and offensive. The soapy stool is found in the non-diarrhœic group and the fatty-acid stool in the classical diarrhœic form of cœliac disease.

5. Recognition of the non-diarrhœic group suggests that the diarrhœic cases may show considerable naked-eye improvement in the stools without there being a return to the normal power of fat absorption—in other words, that during the quiescent and convalescent stages in cœliac disease the essential failure in fat-absorption will still be recognisable by analysis of the stools. Examples are quoted to prove this point.

6. Its recognition also affords strong evidence against the view that cœliac disease is due to an enteritis or that it has any essential connexion with intestinal disease.[4]

7. A consideration of the two sorts of stool in cœliac disease—the pale fatty acid and the coloured soapy stools—leads to the view that the pallor of the

classical cœliac stool is due not to an absence of bile-pigment, but rather to a masking of the pigment by the excess of fat present as fatty acid crystals.

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INJECTION OF ALCOHOL IN THE TREATMENT OF PROLAPSE OF THE RECTUM

IN INFANCY AND CHILDHOOD.

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THAT rectal prolapse in infancy and childhood is a troublesome condition to treat no one who has had much experience of out-patient practice at a children's hospital will deny. It is a condition, too, of some seriousness, as it not only causes the patient and his parents much inconvenience, but at times so undermines the general health, especially during infancy, that severe and occasionally fatal complications ensue. These, I have no doubt, are dependent on the accompanying diarrhœa. Though it must be admitted that in a proportion, perhaps even in a majority, of the cases the condition cures spontaneously, this salutary result may be delayed for many months, as the appended table shows, and during this interval much damage to the nutrition of the child may have been caused.

Many devices have been suggested for its cure. These range between simple replacement and strapping of the buttocks and rectopexy or rectococcypexy. Our experience of simple replacement and strapping of the buttocks has been disappointing. We have seen cases treated in this fashion and kept lying prone in bed for weeks without any benefit resulting, in marked contrast to the results of the method described in this paper.

The Method Described.

The method was first seen in practice by one of us (L. F.) in the clinic of Prof. A. D'Espine, of Geneva, and consists in the introduction of a small amount of absolute alcohol into the loose areolar tissue surrounding the rectum. In April, 1921, one of us (L. F.) published a note[1] on the results in some 22 children. Since then we have had a more extended experience of the method, and our first favourable opinions have been fully justified. As the operation is so simple in its technique, so efficient in its results, and apparently so devoid of all danger, we consider that it should be more widely known; hence we are prompted to make this further communication.

The operation must be performed under full anæsthesia, and it is advisable to empty the lower bowel by means of an enema. The prolapse, if down, is reduced and the perineum washed and sterilised with iodine. With the finger in the rectum, to act as a guide, 1·5 c.cm. of absolute alcohol are then introduced on each side into the peri-rectal tissue at a depth of 2 in. to 2½ in. An ordinary exploring syringe is employed, the needle being inserted on each side about ¼ in. from the anal margin. The needle punctures are sealed with collodion, a pad placed in the perineum and kept in position by strapping the buttocks firmly together. Instructions are given that the child must only move the bowels while in the recumbent position, the fæcal matter escaping by the side of the dressing. The pad and strapping are reapplied daily for a week; by this time it has been found, as a rule, quite safe to discard all appliances.

In the cases treated by us there has been no selection. Some of them were exceedingly severe, the prolapse being constantly down, and that to the extent of 4 to 6 inches. Diarrhœa would seem to be no contra-indication. In our opinion the prolapse is more often the cause of the diarrhœa—or at least of persistence of the diarrhœa, probably in consequence of irritation and ulceration of the bowel—than that the diarrhœa is the cause of the prolapse, as is so frequently stated. Should, however, a polypus be present as the exciting cause, it is, of course, necessary that it be removed in the first instance.

Details of Cases.

Details of the cases and results are given in the following table:—

No.	Sex.	Age.	Duration of prolapse.	Date of operation.	Date of last report.	Result of prolapse.
1	F.	10/12	1 m.	5: 5:20	28: 8:22	Returned during whooping-cough. N.R. after 2, 3/12.
2	F.	1, 9/12	19 m.	5: 5:20 11: 9:20	1: 9:22	N.R. after 2 y.
3	F.	5/12	5 d.	7: 8:20	28: 8:22	N.R. in 2 y.
4	F.	3 y.	18 m.	26: 8:20	5: 3:21	Down once with severe straining
5	M.	1, 11/12	1 m.	31: 8:20	29: 1:21	N.R. in 5/12.
6	M.	1, 8/12	2½ m.	20: 9:20	26:10:21	N.R. in 1, 1/12.
7	F.	2, 5/12	3 w.	29: 9:20 2:10:20 20:10:20	26:10:21	N.R. in 1 y. after last injection.
8	F.	4 y.	2 y.	2:10:20	30: 8:22	N.R. in 1, 11/12
9	F.	2 y.	5 m.	6:10:20	2: 8:22	N.R. in 1,10/12.
10	M.	3 y.	1½ y.	16:10:20	31: 8:22	Much improved: still comes down.
11	M.	5½ y.	S.I.	20:10:20	31: 8:22	N.R. in 1,10/12.
12	F.	2½ y.	S.I.	20:10:20	28: 8:22	N.R. in 1,10/12.
13	F.	5/12	1 w.*	26:10:20	27: 8:22	N.R. in 1,10/12.
14	M.	2½ y.	3 m.	27:10:20	4: 9:22	N.R. in 1,10/12.
15	F.	3 y.	1 y.	10:11:20	28: 8:22	N.R. in 1,9/12.
16	F.	3 y.	3 w.	24:11:20	15:12:20	N.R. in 3 w.
17	M.	1, 6/12	2 m.	1:12:20	29: 9:21	N.R. in 10/12.
18	F.	1, 1/12	2 m.	15:12:20	27: 8:22	N.R. in 1, 8/12.
19	M.	3, 1/12	1 y.	15: 1:21		Improved; still comes down occasionally.
20	F.	2, 8/12	2 m.	26: 1:21	12: 3:21	N.R. in 6 w.
21	M.	3, 5/12	1 y.	5: 2:21	28: 8:22	N.R. in 1, 7/12.
22	F.	2½ y.	3 w.	15: 2:21	10: 9:22	N.R. in 1, 7/12.
23	F.	4, 3/12	6 d.	4: 2:21	1: 9:22	N.R. in 1, 7/12.
24	F.	1, 10/12	2 m.	4: 2:21	28:10:21	N.R. in 8/12
25	M.	5 y.	6 m.	23: 2:21 2: 4:21	28: 8:22	N.R. in 1, 5/12.
26	F.	3, 4/12	8 m.	5: 3:21	1: 9:22	N.R. in 1, 6/12.
27	F.	2 y.	14 m.	5: 3:21	29: 8:22	N.R. in 1, 6/12.
28	M.	4 y.	1 y.	12: 3:21	1:11:21	No improvement.
29	F.	3 y.	9 m.	19: 3:21	31: 8:22	N.R. in 1, 5/12.
30	F.	10/52	3 d.	23: 4:21	1: 5:21	N.R. in 8 d.
31	F.	2, 8/12	4 m.	23: 4:21	1: 9:22	N.R. after 1, 4/12.
32	F.	3 y.	2 m.	9: 5:21	1: 9:22	Not down for 7 months (*a*).
33	M.	2, 5/12	6 m.	18: 5:21	4: 6:21	N.R. in 17 days.
34	F.	1, 4/12	3 m.	21: 5:21	3: 9:22	N.R. during past 10/12 (*b*)
35	F.	2 y.	5 m.	1: 8:21	15:10:22	N.R. in 14/12(*c*)
36	M.	3 y.	3 m.	13: 8:21	15:10:22	
37	F.	2½ y.	4 d.	17: 8:21	28: 8:22	N.R. in 1 year.
38	F.	2, 3/12.	4 m.	4:11:21	1: 9:22	Remained up for 6 m. (*d*).
39	F.	1, 3/12	3 w.	5:11:21	12:11:21	N.R. after 7 days.
40	F.	3 y.	3 m.	5:11:21	30: 8:2 2	N.R. in 10/12.
41	M.	3 y.	4 m.	9:11:21	1: 9:2 2	N.R. after 10/12

* Constantly down for 1 week to extent of 3 or 4 inches.
y = years, m = month, w = week, d = day. S.I. = Since infancy. N.R. = No return.

(*a*) Previously came down a few times during measles and whooping cough.
(*b*) Came down a few times with diarrhœa.
(*c*) No improvement. Child never returned after injection.
(*d*) Then developed measles. Down frequently since.

We have treated 41 children in all. In seven cases the prolapse had been in existence for less than a month; in ten cases it had been present for more than a year. In two cases the operation had to be repeated once, and

[1] Brit. Jour. Child. Dis., 1921, vol. xviii., p. 83.

in one case twice, but in all the other examples only one treatment was necessary to obtain a cure. In 37 (90 per cent.) of the cases a cure was obtained; in 17 of these cases a report was obtained regarding the condition as long as from 18 months to two years after the operation. In two cases the condition was much improved, the prolapse still occasionally coming down. In two cases no improvement was obtained, but in these instances it may be remarked that the operation had only been performed once, the parents refusing further treatment. In no case have we seen any untoward after-effects—in fact, we have been agreeably surprised at the absence of all bladder trouble, which is such a common consequence of any rectal operation.

It must be admitted that it is somewhat difficult to understand the modus operandi of the treatment. We suggest, however, that the chief factor may be inflammation occurring at the seat of the injection with consequent cicatrisation and anchoring of the bowel, though probably the return of tone to the sphincter ani, which is permitted to take place during the period of strapping, also plays some part.

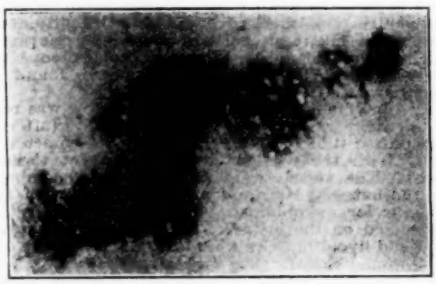
A SKIN ERUPTION DUE TO A MOULD.

BY CHARLES RUSS, M.B. LOND., M.R.C.S.

THIS eruption affected a small group of workers employed in sorting and packing various kinds of dried foods—foods, however, which would not be consumed without cooking. The firm was long established, and had no previous experience of a similar occurrence. Some of the workers attended one of the skin hospitals, and presently, in view of the uncommon type of lesion, it was decided to have a bacteriological inquiry made. After infection there appeared on the fourth day a raised red papule, which became vesicular on the sixth and pustular on the eighth day.

I took material from several of the affected workers. In smear preparations few bacteria were visible—viz., a few micrococci and diphtheroid bacilli, and rarely, a spore-like body. Although a number of cultivations were made from several cases there was only a negligible diphtheroid colony obtained from one case. By observation, however, of these apparently sterile cultures a growth occurred after 14 days' incubation of a fine filamentous growth resembling a mould. Microscopic examination of this growth showed a freely branching mycelium bearing endospores. Inoculation of this culture into my arm produced the eruption (Fig. 1). The eruption was highly irritating, and a rather strong burning feeling was experienced at the spreading edges. Dr. Graham Little was interested in the experiment, and successfully prescribed a salicylic ointment to clear up the condition. I recovered the mould in pure culture also from the experimentally produced lesions.

FIG. 1.



Eruption on forearm. (About natural size.)

A pure culture was submitted to Prof. G. Massee, who reported it to be a typical cercosporella, but one which does not correspond to any described variety. He suggested the apt name for it of *Cercosporella vexans*. It has apparently a resemblance to the asteroid tricophytons.

After the introduction of antiseptic and preventive measures at the works there were no more cases amongst the employees. Before measures were taken no germicides were used in the lavatories, and only one nail-brush had been in common use.

FIG. 2.

The mould after five weeks' growth and before the development of the cotton-wool change in the core.

Location and Character of the Organism.

The next object of the inquiry was to locate the offending organism in the foods or in the sacks in which they arrived from all parts of the Colonies and the Orient. I may mention that the workers were all affected on the palmar surfaces of the forearms only. The work was chiefly done on benches which were usually covered with sacking which had functioned as the container of the goods. There had obviously been inoculation of the workers' skin by friction over the sacking, particularly in the limbs traversing the bench edge. The organism grew well on Sabouraud's medium, which was used for the first 24 hours; after that the cultures were continued at laboratory room temperature.

The characters of the growth were as follows: Second day, a heaped gelatinous mass; fourth day, short silky spines developed on the core; fifth day, a skirting of filaments growing from the edge of the core on the surface of the medium. Eighth to tenth days, three zones are apparent in the growth: (1) the core covered with filaments, (2) dense skirt of filaments, and (3) a halo of filaments at the periphery. Tenth to fourteenth days: (1) the core becomes a snowy growth, (2) this is covered by snowy growth, (3) the peripheral zone consists of long filaments. Fourteenth to eighteenth day, the periphery of the colony cleaves into radially divergent filament groups. Fig. 2 shows the appearance after five weeks' growth. After two months, *duvet* (Sabouraud) change is manifest in the core. The growth is pure white, and after a few months becomes a pale fawn colour.

Extensive cultivations were made from the goods, from the sorted decayed specimens, and from their corresponding sacks, in an attempt to find the source of the organism. I was, however, unable to locate it in any of the numerous samples examined: but the exhaustive search showed, from the number and variety of moulds found and subcultured even from samples under observation for six months, that such a mould might be viable for a long time. In this

work I was impressed with its similarity to many other moulds. Several hundred suspected colonies were subcultivated, and further observed on Sabouraud's medium. So close was the resemblance of suspects in the early stages of growth that often it was not until the tenth day that a pale green coloration of the growth signalled the ultimate rejection of a suspect that had copied the pattern for that period.

Microscopy itself I found of little use compared with culture identification. I concluded that the mould was probably contained in some of the sacks, and that there was, of course, direct inoculation by friction into the workers' arms.

Note by E. G. GRAHAM LITTLE, M.D., F.R.C.P. Lond.

My friend Dr. Charles Russ showed me a small patch of a vesicular eruption on his forearm, the nature of which puzzled me considerably. The vesicles were grouped and showed an inflammatory areola, and were accompanied by intense itching. The statement that they had appeared in the site of an experimental inoculation of course removed all difficulty of diagnosis, and the cultures obtained made it certain that the fungus was a ringworm.

Clinical and Laboratory Notes.

A NOTE ON THE TREATMENT OF WHOOPING-COUGH.

BY FRANK PARRY, L.R.C.P. IREL.

THE therapeutic measures in vogue for whooping-cough fall into two categories, the effective but unbearable, and the tolerable but inefficacious. In the first division are antiseptic nasal douches and intramuscular injections of ether. Though these can sometimes abort pertussis, they terrify the little patients, and consequently are so repugnant to their patients that the physician who employs them will find that however beneficial they may be to the sufferer, their effects upon his practice will prove almost lethal. In the second category may be included antispasmodic drugs, of which benzyl benzoate is the best. This symptomatic form of treatment is but palliative, and does not materially shorten the illness or avert its complications. Vaccine therapy is uncertain, being only of use when employed at an early stage, and not invariably then. It is of value chiefly as a prophylactic.

In a recent epidemic I have employed lactic acid bacilli preparations, of which I have found lacteol to be the best. A few grains were blown up the patient's nostrils with an insufflator four times daily. If used more often, slight epistaxis may be caused. This procedure has never been resented by the young or timid. Within 24 hours the puffy appearance disappeared from the face, and vomiting, if present, subsided. The whoop disappeared invariably in a period of from two to eight days. Sometimes a persistent irritating cough at night time has been complained of afterwards. In every instance this was found to be due to a dribbling of mucus from the posterior nares on to the back of the pharynx; it invariably ceased when a sleeping posture was adopted that caused the floor of the nasal fossæ to incline forwards.

The first experiment was made on the hypothesis that *B. acid lactici* might overwhelm *B. bordet*, but this explanation of the action of this remedy can hardly be accepted, the improvement in the symptoms taking place so quickly. Possibly the effect is in the nature of a protein reaction. My series of cases (30) is small, but the results were so marked and so uniform that I feel justified in calling without more delay for the verdict of others better equipped for making observations and with ampler clinical material than myself, on this simple, unobjectionable, and, in my experience, speedily effectual method.

Birmingham.

THE CHRONIC ANTRUM.

BY T. B. JOBSON, M.D., B.CH. DUB.,
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THERE appeared in THE LANCET of Nov. 18th last an article by me on The Acute Antrum, in which I pointed out that nasal sinus suppuration is much commoner than is generally recognised, that it is responsible for many of the toxæmias which are labelled neuritis, rheumatism, nasal catarrh, dyspepsia, &c., and that the signs indicating the septic focus in the sinus may be slight or altogether absent. I urged the importance of bearing in mind the possibility of sinus infection in obscure cases where a cause for toxæmia—either acute or chronic—could not be found.

On Nov. 19th a lady came to consult me; she gave a history of neuritis and had had a slight post-nasal discharge. I inquired the name of the doctor who had referred her to me. "No doctor," she replied, "I read your article in THE LANCET and formed the opinion that I might have an 'antrum.'" "You are a doctor, I presume?" "Oh no, I just take an interest in medical matters—and so I read THE LANCET."

I examined her nose. There was no sign of pus visible by anterior and post-anterior rhinoscopy. The mucous membrane of the nose looked pink and healthy. Trans-illumination showed the shadows equal and fairly clear on both sides. I informed my patient that so far I had found no evidence of sinus infection, but to make certain I should have to puncture the antrum and wash it out. She was eager to have this done. After cocaining the left side I washed out from the antrum through a Lichtwitz cannula several blobs of muco-pus.

This was rather a wonderful diagnosis for a lay-woman. In her the medical profession missed a keen diagnostician! The story goes to prove that nasal sinus suppuration is unobtrusive and that if the possibility of its presence is not borne in mind, and unless it is carefully searched for, it will escape detection, much to the detriment of the patient.

HEMILARYNGECTOMY FOR CARCINOMA.

BY FRANCIS MUECKE, C.B.E., F.R.C.S. ENG.,
ASSISTANT SURGEON, EAR, NOSE, AND THROAT DEPARTMENT, LONDON HOSPITAL.

THE following unusual case illustrates the value of hemilaryngectomy for carcinoma:—

The patient was a thin, frail woman aged 48, who had suffered from two months' hoarseness. Examination showed definite growth of the anterior half of right vocal cord, about the size of a haricot bean, and slightly encroaching on subjacent tissue. There was slight movement of the right arytenoid only. With the bronchoscope a small piece was removed for examination and found to be epitheliomatous.

After a preliminary tracheotomy, a window was removed from the right wing of the thyroid cartilage (after Lack), leaving only a thin rim with the muscle attachments undisturbed. With the window all the subjacent tissue were removed. The vessels were easily ligatured coming from under the external rim, and an excellent view of the left side of the larynx obtained. The growth was seen to be well included on the inside of the removed window. The thyroid and hyoid muscles were then sewn over the opening and the wound closed. The tracheotomy tube was left in five days and the patient was discharged on the eighteenth day with a fairly audible voice.

Seen six months later, the patient had increased in weight and was stated to be in excellent health. The voice was good, well above an audible whisper, and could be understood across the room. The muscles had protruded slightly into the larynx, and a distinct ridge was seen where the left cord impinged. There was no sign of any growth or ulceration.

One of the benefits claimed for this method is that the operation can be speedily performed and so greatly assist in the prevention of broncho-pneumonia so favoured by long anæsthesia. The total time of the above operation was 25 minutes. Furthermore, subsequent movements of the larynx are little interfered with and the mucus therefore easily dislodged and expectorated, and not allowed to lie about and become septic. The patient should be made to sit up immediately following recovery from anæsthesia.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF SURGERY.

A MEETING of this section of the Royal Society of Medicine was held on Jan. 3rd, with Mr. JAMES BERRY, the President, in the chair.

Mr. W. SAMPSON HANDLEY opened a discussion on

THE PATHOLOGY AND OPERATIVE TREATMENT OF RENAL CALCULI.

He said that it was commonly held that renal calculi were formed only in the pelvis or calyces, but his own observations in two cases suggested that a stone might originate in a cyst in the substance of the kidney unconnected with a calyx. In the first of these cases calculi were removed from one kidney successfully, but death occurred after the removal later of a number of stones from the other kidney. The necropsy showed a small cyst in the second kidney containing turbid fluid and lined by gritty débris. The cyst was not connected with the calyces. The second observation occurred during an operation; a number of calculi were removed by subcapsular pyelotomy, but two small calculi known to be present could not be detected by a finger within the pelvis. Bi-digital palpation revealed slight induration at two points, and on incising the kidney at these points the calculi were found, each lying in a smooth-walled cyst unconnected with a calyx. A specimen (No. 3618) in the museum of the Royal College of Surgeons of England showed a calculus in the renal pelvis, while there was an empty cystic cavity close to the capsule communicating by a narrow neck with a long dilated calyx. He suggested that the stone had formed in the cyst and ulcerated into the calyx, from which it passed to the pelvis. Again, kidneys which were the seat of calculi were often described as having calyces extending almost to the surface, although the kidney substance was not greatly atrophied, while normal calyces ended at the apices of the pyramids. He was unable to form any estimate of the frequency with which stones were formed thus, but he suspected that it was not uncommon. It was evident that the conditions within a urinary cyst of the kidney favoured precipitation.

Pyelo-lithotomy v. *Nephro-lithotomy.*

Mr. Handley considered the splitting of the kidney to be a procedure only to be adopted as a last resort, since it sometimes caused dangerous bleeding and always caused permanent injury to the secreting substance of the kidney. Nephro-lithotomy was, however, the only possible procedure short of nephrectomy in some cases, such as very large stone, or in cases with a short pedicle and a deep loin. Restricted nephro-lithotomy—i.e., the extraction of stones through small incisions in the kidney—was advocated by Hartmann when a stone could be plainly felt in the kidney near its surface. This had the merit of rapidity, directness, and simplicity. During the operation the kidney pedicle should be compressed by an assistant, and the incisions should be closed by catgut sutures. Bipolar nephrotomy (Legueu) was advocated by some surgeons when the stone could not be palpated externally. In this operation the kidney pelvis was reached by incisions in the upper and lower thirds of the kidney-splitting incision into the upper and lower calyces. It was claimed that the whole kidney could be explored thus, but the speaker had found it useless for exploring the pelvis. Albarran's "Unipolar nephrotomy" was open to the same objection. The plumber seeking a defect in a drainage system opens first the manhole into which the accessory drains converge, and from which all are accessible. For similar reasons Mr. Handley maintained that the kidney should be explored from the pelvis in all cases with the limited exceptions already made. Pyelotomy should be the routine first step in the operative examination of the kidney, and nephro-lithotomy regarded as a last resort.

Pyelotomy.

Pyelotomy was an operation of comparatively recent introduction; it was not mentioned in the 1904 edition of Cheyne and Burghard's Manual of Surgical Treatment. The operation consisted of the opening of the renal pelvis by a longitudinal incision in its posterior aspect after delivering the kidney and clearing the fat from the pelvis. A posterior branch of the renal artery and irregular vessels should be avoided. Through this incision a stone in the pelvis could be extracted and the interior of the pelvis and calyces explored by means of a probe—a stone so discovered being extracted with forceps. The wound in the pelvis could be closed by interrupted catgut sutures or, as Thomson Walker advocated, by suturing over it a flap of fibrous capsule turned down from the kidney. Mayo originally used a flap of fatty tissue for a similar purpose, but had now, according to Hartmann, given up any form of suture as unnecessary. While there could be no doubt that suture of the pelvis was unnecessary and tedious, and might reduce the size of the pelvis, the speaker considered that the accurate closure of the wound was desirable if it could be simply and quickly done. In order to attain this he had devised and practised the operation of

Subcapsular Pyelotomy.

The kidney, with its capsule intact, having been delivered from the lumbar wound, an incision three inches in length was made in the fibrous capsule on the posterior surface of the kidney parallel to its convex margin. The capsule was then stripped off the kidney in the direction of the pelvis until the hilum of the kidney was reached. The pocket thus formed was enlarged by blunt dissection until the line of entrance of the pelvis to the kidney was reached; the pelvis was then incised in the line of the long axis of the kidney. Forceps, or the finger if necessary, could now be inserted into the pelvis, its interior explored, and any stones removed. The opening in the pelvis could then be rapidly and effectively sealed by three catgut stitches in the original incision in the capsule. This method of approach had the merit of simplicity, and the flap tended to prevent the soiling of the peri-renal tissues in septic cases. The security from a urinary fistula was apparently absolute. Mr. Handley had performed this operation about a dozen times without any complications. He did not carry his incision in the pelvis too high for there was a theoretical risk of wounding a posterior branch of the renal artery, although he had not had any trouble from this source. Cases of compound branching pelvis did not present the difficulty they might theoretically be expected to do, for the branching did not occur until the pelvis had entered the renal sinus, so that an incision made as described would generally open the main renal pelvis.

Bi-digital Exploration of the Kidney.

When a calculus, known to exist, could not be detected by a probe the incision in the pelvis should be cautiously enlarged until it would permit the introduction of the gloved forefinger; it was then possible by palpation between an external finger and the finger within the pelvis to detect even stones lying in cysts within the renal substance. When a stone had been detected in a calyx thus, it was probably safer to remove it through a small incision in the renal substance, keeping the finger in the pelvis as a guide, than to attempt its extraction through the pelvis and a probably constricted calyx. Mr. Handley urged this method of exploration in preference to nephrotomy, and claimed that while it did less damage it provided a more certain method of discovering a stone than the complete splitting of the kidney. The increased danger of urinary fistula, said by some authorities to follow pyelotomy, was obviated by employing the subcapsular method of approach.

Discussion.

Mr. FRANK KIDD agreed that splitting the kidney was a dangerous procedure, and stated that the bimanual method of exploration had been employed

by urinary surgeons for several years, and stones extracted by limited nephrotomy. He did not like the idea of subcapsular pyelotomy, however, as there was often a large artery low in the pelvis which ran a risk of being wounded by a transverse incision; he thought it safer to perform pyelotomy by an incision in the long axis of the renal pelvis. He had not seen fistula occur after pyelotomy in over a hundred cases; when it did occur it was due to fragments of stone being missed and blocking the ureter. Attempts made to ensure the complete removal of stones by the use of a portable X ray apparatus in the operating theatre had not been very successful in the past, but the Mayos had now an efficient plant for this purpose, although it was still highly dangerous. For bilateral cases he preferred to operate on both sides at one sitting.

Prof. F. HOBDAY said that stone in the kidney or bladder was not uncommon in certain animals, such as the horse and dog, while it was rare in the sheep, pig, and cow, which had shorter lives. In veterinary practice nephrectomy was the only operation employed; he intended to give subcapsular pyelotomy a trial.

Mr. SWIFT JOLY thought it inadvisable to decide on any type of operation beforehand, but chose the operation which best suited the conditions disclosed when the kidney was exposed. In a fat patient pyelotomy was often difficult, but it was to be preferred when possible. Large size was not a contra-indication to pyelotomy when the stone was in the pelvis, and even a branched stone could be removed if naturally divided into two parts and faceted. A large branched single calculus was best removed by nephrotomy and the same operation was necessary for stones in strictured calyces, although calyx stones might readily be removed through the pelvis when there was no stricture. It was becoming unusual not to be able to locate a stone, but when this occurred he opened the pelvis and explored the calyces with the little finger; if this failed he opened the lower calyx from the kidney. He believed that all stones had their origin in a calyx and the cysts described by Mr. Handley were merely parts of calyces which had been shut off; this was known to occur in tubercle.

Mr. HAROLD WILSON emphasised the danger of secondary hæmorrhage after nephrotomy; it had occurred four times in his own practice and he had seen four cases after this operation performed by other surgeons. When this happened nephrectomy was the only recourse. Limited nephrotomy was less dangerous, and he had once been able to wash 60 small stones out of a calyx after incising it from the kidney. He closed an incision in the kidney by two layers of catgut sutures in order to minimise the risk.

Mr. R. H. JOCELYN SWAN said he had reported a case where a stone was found at operation to have been formed in the kidney substance, in which it was firmly gripped. He agreed that it was better to decide on the type of operation when the kidney was exposed, although his preference was for pyelotomy on account of the danger of hæmorrhage after nephrotomy. When he could not feel the stone he opened the pelvis by a longitudinal incision and proceeded to the bi-digital exploration and limited nephrotomy described by Mr. Handley. He made no attempt to suture the pelvic wound accurately and thought there would be no risk in leaving it completely open. No urinary fistula had occurred after pyelotomy in his practice.

Mr. J. E. ADAMS also preferred pyelotomy, but employed a transverse incision in the pelvis when the stone was large. Fistula when it occurred was due to portions of a stone left behind, or to sepsis.

Reply.

Mr. HANDLEY, in reply, said that he believed the branch of the renal artery referred to by Mr. Kidd was pushed aside in stripping the capsule in his operation, since he had not encountered serious hæmorrhage in any case. The case of bilateral stone which he had described was too ill to have stood a bilateral operation. The subcapsular operation was easier to perform than direct pyelotomy when the kidney could not be delivered completely. For hæmorrhage from the kidney he had found plugging with vaselined gauze more effective than suture in one case.

LIVERPOOL MEDICAL INSTITUTION.

A MEETING of this Society was held on Dec. 21st, 1922, with Dr. C. THURSTAN HOLLAND in the chair.

Dr. OSCAR DE JONG read a note on the

Ætiology of Dermatitis in Bakers.

He said that baker's dermatitis occurred in bakers employed in bakeries where the hands are used in mixing, not in bakeries where machines are used. Investigations showed that the flour used was not responsible, as no cases of dermatitis were found in men employed in flour-mills, though these were constantly handling flour. Similarly, no cases were found in men handling or preparing yeast. Dr. de Jong said that the condition was due to immersing hands and arms in the salt solution which is added to the flour, which is about 3·6 per cent. in strength. Owing to the temperature of the bakehouse and the ovens the salt crystallised on the arms of the workman, and the process of kneading worked the crystals into the skin, setting up a dermatitis in susceptible individuals. Cure was obtained by rest from work and local treatment. Dr. de Jong suggested prophylaxis by the use of a spray of fresh water after mixing the salt solution and at periods during kneading. The condition relapsed as a rule, on return to work.

Dr. FRANK H. BARENDT alluded to the terminology of this affection and showed that it was well known in bygone ages. He emphasised the fact that the proportion of those suffering from baker's itch was but slight. In spite of the number of possible excitants and a too vigorous use of soap and water in ablution this circumstance should not be overlooked; one was compelled to admit the presence of idiosyncrasy. Nevertheless, all the necessary preventive measures to which Dr. de Jong had drawn attention should be taken.

Dr. DOBBIN CRAWFORD read a paper on

Clean Milk.

She said that America was the pioneer of the clean milk movement. In England the National Clean Milk Society was founded in 1915, with the following objects: (*a*) To examine the condition of milk as received by the consumer; (*b*) to furnish a standard of clean milk; (*c*) to create a demand for clean milk. It was found in 1915 that the average sample of London milk contained more than 3,000,000 bacteria per c.cm. Tubercle bacilli were present in 10 per cent. of the samples and over 99 per cent. contained *Bacillus coli*—absolute evidence of contamination with manure. A standard of clean milk was furnished in the licences issued by the Ministry of Health in 1921 for the production of Certified Grade A milk, which must contain no *B. tuberculosis*, no *B. coli*, and not more than 30,000 bacteria per c.cm. at any time before reaching the consumer. It must be delivered within two days after the day of production, and every animal in the herd must be examined by a veterinary surgeon and give a negative reaction to the tuberculin test at intervals of three months. Dr. Crawford proceeded to give the following statistics of Liverpool milk, which were quoted from the report of the public health department: Of 943 samples examined in 1921 from 9 to 15·6 per cent. contained tubercle bacilli. The veterinary inspectors in 1921 found 31 cows with tuberculosis of the udder supplying milk to the city. From 80 to 90 per cent. of the samples tested contained *Bacillus coli*, and in that year diarrhœa and enteritis killed 683 infants in Liverpool.

Dr. Crawford considered that the practical effect of grading milk was rapidly to raise the standard of the whole milk-supply, it tended also to increase the consumption of milk. The cost of certified milk was

7½*d.* a pint, just double that of ordinary milk. The need of the moment was the education of the consumers so as to increase the demand for clean milk. Dr. Dobbin Crawford showed a number of lantern-slides to illustrate clean methods of production and their effect. These were taken at the Storms Farm Dairy, Keswick, from which she had received certified milk during the present year. The reports of this milk by the Ministry of Health showed that when 17–18 hours' old it contained no *Bacillus coli* and an average of only 242 bacteria per c.cm. She had persuaded a dairyman in Wallasey to retail this milk, but owing to lack of demand it was not procurable in Liverpool.

Mr. W. A. THOMPSON read a paper on the

Acute Abdomen in the Child Based on 100 Consecutive Cases.

These included 53 cases of acute appendicitis, 15 of which had general peritonitis; of these 5 died. There were 27 intussusceptions, the great majority occurring between the fourth and eighth months, 21 recovered, 6 died, 3 following resection and lateral anastomosis, one of which lived 19 days, and one case moribund on admission died soon after reduction had been performed. The reduction should be intra-abdominal. Many cases were associated with enlarged ileo-cæcal glands, some of which were connected by bands to the gut immediately in front of the original apex of the intussusception. Mr. Thompson explained how these might cause an intussusception and how a much enlarged gland caused a recurrent incipient intussusception. The majority of cases commenced as ileo-ileal—66 per cent.; 8 cases of acute intestinal obstruction were operated on, 5 of these recovered. Three cases of strangulated herniæ had been met with in over 1000 of Mr. Thompson's cases; they all recovered. In pyloric stenosis a plea was put forward for nepenthe ℥ ½ to ℥ ½ doses, and in the severe progressive type an early Ramstedt operation, to which Mr. Thompson attributed his absence of mortality. Cases of volvulus, pneumococcal peritonitis, and hernia of the umbilical cord were also described.

PATHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

A MEETING of this Society was held in the Department of Pathology, University of Sheffield, on Jan. 5th and 6th, with Prof. J. S. C. DOUGLAS in the chair.

S. MCDONALD (Newcastle) showed a remarkable spinal deformity in a small trout he had caught in a Highland loch in which the vertebral column was curved laterally and dorsi-ventrally. Similar deformities were known in other fish. Histologically there was some resemblance to human achondroplasia.

F. W. SIMSON (Sheffield) described a case of splenectomy for splenic anæmia in which the spleen showed nodules of fibrosis with giant cells but with no discoverable tubercle bacilli similar to those published by A. Stengel, E. H. Kettle, and others. There was also a lupoid condition of the skin which was also negative for tubercle microscopically and by inoculation.

A. F. B. SHAW (Newcastle) discussed an example of primary growth of the liver (hepatoma) showing marked nuclear vacuolation and degeneration, active bile formation, and local malignancy by the invasion of blood-vessels. He described also a solitary myeloma of the humerus composed of plasma cells; the patient showed no Bence-Jones albuminuria and was successfully treated by local excision.

M. J. STEWART and H. H. GLEAVE (Leeds) reviewed the Leeds experience of the relation between cirrhosis and carcinoma of the liver. In 166 post-mortems showing cirrhosis there were six examples of carcinoma and three among 3600 without cirrhosis; of six cases of cirrhosis with hæmatomachrosis two had carcinoma. Allowing for sex and age, carcinoma is at least 25 times more common in cases of cirrhosis than in those without.

H. A. HAIG (Cardiff) directed attention to certain granules found in the cells of malignant tumours during mitosis which by their staining reactions he judged to be of nucleolar origin.

J. DAVIDSON (Edinburgh) had found that the repeated application of tar to the skin in rabbits produced marked changes in the liver, first necrosis and degeneration without fatty change and later nodules of regeneration with irregular cirrhosis. The lesions have no definite lobular localisation.

A. LEITCH (London) discussed some points in the surgical pathology of cancer of the rectum with special reference to the permeation of lymphatics.

M. B. R. SWANN (Cambridge) described the functional effects of X rays; the most marked result was a fall of blood pressure when the whole animal was radiated which might progress to a fatal issue: isolated heart, uterus, and intestine were stimulated and the heart ultimately killed in systole.

J. H. DIBLE and P. C. GIBSON (Manchester) had found that injections of Pfeiffer's bacillus or its toxin produced the preliminary leucopenia followed by a neutrophile leucocytosis (with a curious increase in nucleated red cells) which is caused by many other organisms.

W. J. WILSON (Belfast) described media suitable for the study of the sulphur bacteria and for investigating the reduction of sulphites by many of the well-known pathogenic organisms.

J. W. MCLEOD, J. GORDON, and L. N. PYRAH (Leeds), in continuation of their work on the production of hydrogen peroxide by pneumococci, had found that *B. acidophilus*, *B. bulgaricus*, and other lactic acid species also produced peroxide which could conveniently be demonstrated by a benzidine-chocolate (Crowe-Penfold) medium.

J. W. MCLEOD (Leeds) described a fatal human case of multiple abscesses in liver and lung from which by blood culture during life he had isolated a streptococcoid yeast-like organism (blastomyces ?), pathogenic to rabbits but not to mice or guinea-pigs.

S. L. CUMMINS and C. M. ACLAND (Cardiff) brought forward the results of an extensive study of tuberculo-opsonins. Taking as an index the percentage of active phagocytes, rather than the number of bacilli taken up or the dilution of serum at which phagocytosis ceases, they drew particular attention to the occurrence of "zones of inhibition" which are shown only if various dilutions of serum are examined at each trial.

A. GOUGH (Leeds) described yet another method of doing the Wassermann reaction with human complement.

A. F. WATSON and U. WALLACE (Beckenham) showed that it was possible to produce large quantities of uniform high-grade diphtheria toxin by careful attention to the preparation of P. Hartley's modification of S. R. Douglas's horse-flesh peptic digest medium.

J. C. G. LEDINGHAM (London) showed specimens illustrating the histology and diagnosis of tularæmia infection in animals and man.

H. H. GLEAVE (Leeds) demonstrated a case of multiple gastric adenomatous polypi coexisting with a carcinoma.

J. G. GREENFIELD (London) described the histology of the changes in the muscles in two cases of Volkmann's contracture and discussed the causation of the muscle atrophy and degeneration and the consecutive fibrosis from the periphery.

G. S. WILLIAMSON (London) exhibited a number of microscopical preparations showing what he believed to be an undescribed system of intercellular tubules in the thyroid and other secreting epithelia.

G. WILKINSON (Sheffield) demonstrated his model of the cochlea.

MRS. MAY MELLANBY (Sheffield) exhibited a large number of specimens illustrating her work on the effects of diet on the growth of teeth, and discussed the significance of the results which had been obtained.

Many pathological specimens of interest were shown by Prof. DOUGLAS and the staff of the department.

Reviews and Notices of Books.

THE PRACTICE OF MEDICINE.

By A. A. STEVENS, A.M., M.D., Professor of Applied Therapeutics in the University of Pennsylvania, Philadelphia; Visiting Physician to Philadelphia General Hospital. London and Philadelphia: W. B. Saunders Company. 1922. Pp. 1106. 35*s*.

THIS new text-book of medicine comes as a proof that physicians are still prepared to face the task of giving a personal survey of the whole of their vast subject. Recent years have seen the appearance of several new text-books and new editions of well-known ones, a striking change in each case being the allotment of various sections to different writers. Dr. Stevens has courageously followed in the footsteps of his old master, Sir William Osler, and of other famous writers, and has produced his book almost unaided. We congratulate him on the result, and if it be said that his work shows no great advance over similar existing volumes, it is nevertheless true that the views of one master, expressed by himself, make an appeal to certain types of student stronger than the varying voices of a series of experts. An inherent disadvantage, however, of the one man-power book is that certain subjects must be less well treated than others, and we regret the stress which Dr. Stevens at times lays on aspects of pathology which are at present without the full support of considered criticism. Thus his chapter on asthma appears to pay too much attention to the chemical side of the disorder and deals very briefly indeed with the nervous factors. Rickets is placed in a section devoted to food-deficiency diseases, though the evidence adduced in favour of such classification is hardly convincing; the work of E. Mellanby is not even referred to. If in some directions Dr. Stevens appears hasty in his acceptance of new pathological conceptions, there are others in which he is more conservative than are most of the modern British writers. Thus he places diabetes mellitus amongst the disorders of metabolism and shows some reticence in accepting the pancreas as the chief seat of disease; there is no reference to the recent work on insulin. In the section on nervous diseases the description of subacute combined degeneration is somewhat inadequate, and the inaccurate term "sclerosis" is employed in describing the pathological changes in the cord.

Such inequalities as we have pointed out are an indirect tribute to the rarity of serious defects in a volume which will take a worthy place amongst the accepted text-books of medicine.

DIATHERMIE ET DIATHERMOTHERAPIE.

By Dr. H. BORDIER, Professeur agrégé à la Faculté de Médecine de Lyon. Preface by Prof. BERGONIÉ. Paris: Baillière et Fils. 1922. With 137 illustrations. Pp. 512. Fr.30.

THIS large book contains seven parts, of which the first deals with the physics of high-frequency currents and the principles underlying the production of currents of sustained oscillation capable of producing diathermy. Various types of apparatus are described in the second part, which treats of the conduction of high-frequency currents by the body, the path which they take through different conductors, and the resistance offered to them by the body. The third part deals with the physical and physiological properties of the diathermy current. Various experiments are described in order to show the rise of temperature which these currents can cause in inert conductors, excised tissue, and the living body. Some experiments on animals are included, and the influence of diathermy on the respiratory and circulatory systems is discussed. The properties of diathermy as a cauterising agent, and the ways in which they differ from those of other methods, are described in the fourth part, together with various electrodes and the ways in which the operation of cauterisation by diathermy can be performed. The different morbid conditions which can be treated with advantage by surgical diathermy are next considered, while medical diathermy forms the subject of the sixth and seventh parts, the former dealing with technique, the latter with clinical experience in the use of diathermy for the treatment of diseases of the various systems of the body.

Prof. Bordier's book is as far as we know the first book published by a French author on the principles and practice of diathermy, and English practitioners of electro-therapeutics will find much that will interest them and confirm in their minds the value of diathermy in the treatment of many maladies, and the good results obtained in the treatment of diseases such as rhinophyma, lupus erythematosus, lupus vulgaris, xanthelasma—these being conditions for which it has been used less often in this country. Of special interest is the account of the effects of diathermy applied to the abdomen for dilatation of the stomach with diminution of the hydrochloric acid; the dilatation was reduced and the quantity of acid increased, as was ascertained by means of test-meals. The author states that the use of diathermy for the destruction of malignant growths has received less attention in France than in England, and he gives full recognition to the work of English electrologists. He indicates the value of diathermy for the removal, without hæmorrhage, of enlarged tonsils. He also points out the usefulness of diathermy for the destruction of enlarged prostate, and quotes some brilliant results obtained by Luys. The operation, he says, can be performed without general anæsthesia and on out-patients, but interference must be restricted to cases in which the enlarged gland does not extend into the bladder. Altogether Prof. Bordier's work is a comprehensive yet concise treatise on its subject.

ANÆSTHETICS.

Practical Anæsthetics. By CHARLES F. HADFIELD, M.B.E., M.D. London: Baillière, Tindall and Cox. 1923. Pp. 244. 7*s*. 6*d*.

THIS is a small book, easy and pleasant to read, and gives in clear terms most of the important facts about the selection and use of general anæsthetics. Dr. Hadfield has wisely not confused his issues by a multitude of alternatives, but has generally selected what he considers the best methods, has described their use fully and plainly, and has ignored the rest. Thus he furnishes the inexperienced with a useful guide to practice. With one or two observations we do not agree. Laryngeal spasm we believe, contrary to the author's statement, to be more frequent during chloroform than during ether anæsthesia, and we do not think that the commonly used doses of atropine affect the pupil at all. In explaining post-anæsthetic lung complications, Dr. Hadfield ignores massive collapse and reflex inhibition of the diaphragm. For routine use he favours induction by means of ethyl chloride and ether with 1 in 16 of chloroform. This is used in a Clover's inhaler. It is undoubtedly a very effective and rapid method which is not unpleasant to the majority of patients. For abdominal cases open administration of ether is preferred by Dr. Hadfield.

This little book will be found useful by practitioners and students.

Anæsthesia in Children. By C. LANGTON HEWER, M.B., B.S., Assistant Anæsthetist to St. Bartholomew's Hospital. London: H. K. Lewis and Co. With 31 illustrations. 1923. Pp. 111. 4*s*. 6*d*.

Dr. Hewer is right in claiming that too little importance is usually attached to the giving of anæsthetics to children, and that the average medical student leaves a general hospital having little knowledge and less practical experience of that particular use of anæsthetics. Yet it is true that young children exhibit peculiarities in their reaction towards anæsthetics that are important to recognise and that can be learned only by experience. The practitioner almost inevitably is

called on to give anæsthetics sooner or later to a young child. The brief operations commonly performed on the young are often thought to be just those the anæsthetic for which may safely be trusted to one not necessarily an expert in administration. Actually the opposite is the truth, and the disastrous result of not realising it may be read in the returns of the Registrar-General. Quite a formidable position will be found there occupied, for instance, by fatalities during the operation of circumcision, and we regret that Dr. Hewer does not single this common little operation out for special mention. His book gives much sensible advice, both as regards actual administration of the anæsthetic and on preparation and after-treatment. We hope, however, that his use of the verb "induce" as applied to the patient instead of to the state of anæsthesia will not become common; the patient "was induced with closed ethyl chloride" is not a happy phrase, provoking the question what closed ethyl chloride and the patient were together induced to do. Dr. Hewer's statement of the general principles to be observed in managing children is sound, and the little book is distinguished by a conciseness valuable to young practitioners. It should be a welcome addition to the library of residents at children's hospitals.

DICTIONARY OF MEDICAL TREATMENT AND DIET.

Second edition. By JAMES BURNET, M.D., Lecturer in Diseases of Children, School of Medicine of the Royal Colleges, Edinburgh. London: A. and C. Black, Ltd. 1922. Pp. 156. 5*s*.

A subtitle, "A Guide to Therapeutics for Students and Practitioners," describes well a book which contains something more than the treatment which can be derived from text-books of medicine, but much less than the large indexes of treatment from which it differs in being purely medical. It is a handy volume for quick reference on ordinary medical subjects. The author steers successfully between the difficulty of treatment without sufficient diagnoses—that is, of treating symptoms and not diseases—and that of filling too large a portion of his book with notes on differential diagnosis. It is perhaps from conviction, but perhaps from oversight, that he dismisses modern treatment of syphilis very lightly in saying, "Intravenous injections of kharsivan, neokharsivan, or galyl may be given in suitable cases. These injections are a valuable adjunct to the ordinary medicinal treatment." Again, X ray treatment of ringworm is dealt with in the sentence, "The most rapid and satisfactory results, however, are obtained by the use of Rontgen rays," and a warning against the use of these rays by the novice. Even if the student or practitioner does not want to use these methods he wants to know more about the technique than these brief sentences convey. The appendix on diet is short but not inadequate.

LES PHÉNOMÉNES DE DESTRUCTION CELLULAIRE.

By LOUIS BORY. Paris: Masson et Cie. 1922. Pp. 211. Fr.12.

Dr. Bory has put together a well-arranged and readable account of autolysis, cytolysis, bacteriolysis, and kindred phenomena. The information he gives is already easily available in other places, and he does not deal with it in any particularly original way; however, though the book may not throw fresh light on the subjects it deals with, it can nevertheless be read with pleasure and profit. Among a great mass of good material, we must note two topics which are badly dealt with. The account of isohæmolysins (pp. 174 ff.) fails to appreciate at all the significance of "blood-groups," either from the point of view of genetics or that of practical transfusion. In the section on the poisonousness of the products of autolysis (pp. 32 ff.), those who are familiar with the work on secondary shock, no longer very new, will be surprised to find no reference at all to Cannon, Bayliss, and Dale. It has surely been one of the greatest pieces of recent progress in general pathology to realise that the remnants of destroyed cells, which can, in small amounts, arouse the reaction which results in the healing of the wound which caused the destruction, will in increasing concentrations produce more and more substantial evidence of general poisoning until in very large amounts they are pretty rapidly fatal. Dr. Bory's book is beautifully produced.

THE THEORY OF EMULSIONS AND EMULSIFICATION.

By WILLIAM CLAYTON, D.Sc., F.I.C., Secretary to the British Association Committee on Colloid Chemistry and its General and Industrial Applications. With Foreword by Prof. F. G. DONNAN, C.B.E., M.A., Ph.D., D.Sc., F.R.S. London: J. and A. Churchill. 1923. With 22 illustrations. Pp. 160. 9*s*. 6*d*.

THE study of emulsions forms one of the most important and interesting in the domain of physical chemistry; emulsions are of great theoretical interest in connexion with the properties of emulsoid colloids, in relation to the problems of surface-tension, adsorption and Brownian movement, and furthermore, have many points of contact with biochemistry. One of the most interesting of these is the question of the inversion of emulsions, or reversal of phase, in its relation to the permeability of membranes. These properties will be found fully discussed in the present volume, which also contains much that is of importance to the technical chemist—for colloid chemistry has many applications to industry. This monograph, though representing a special branch of the special subdivision of physical chemistry known as colloid chemistry, will find a ready place in our literature, and will be acceptable to a wide circle of specialists, as well as to students of physical chemistry.

A LABORATORY HANDBOOK OF BIOCHEMISTRY.

By P. C. RAIMENT, B.A. Oxon., M.R.C.S., L.R.C.P., Senior Demonstrator of Biochemistry, University of Oxford; and G. L. PESKETT, B.A. Oxon., Demonstrator of Biochemistry, University of Oxford. London: Edward Arnold and Co. 1922. Pp. 102. 5*s*.

THIS little book is intended for the junior student. Throughout short theoretical accounts precede the practical work on the same subject. The authors appear to have carried the process of elimination, even for a junior student, a little far, for among the tests or exercises omitted are Seliwanow's test for cane sugar, Volhard's method of estimating the chlorides in urine, and the acetone method for the extraction of urea from urine. There is an error on p. 43 where cholesterin is included with lecithin as a phospholipin; it is correctly described on the next page.

DIE EPIDEMISCHE ENCEPHALITIS.

By Prof. Dr. Med. FELIX STERN, Oberarzt der Universitätsklinik für Psychische und Nervenkrankheiten, Göttingen. Berlin: Julius Springer. 1922. Pp. 228.

THIS is a monograph treating of certain features of epidemic encephalitis which have specially interested the author. It does not pretend to give a complete account of the disease. Prof. Stern has based his monograph on 105 clinical cases of epidemic encephalitis observed by him in Göttingen and nine cases anatomically examined. These cases have presented certain salient features, and Prof. Stern supports his views on their significance by quoting liberally from the literature and chiefly from the writings of his fellow-countrymen. This collated work is thorough and painstaking; it would have been of greater value if numbered references had been given to the articles of the authors quoted and if the bibliography had included all the authorities cited in the text. It is explained, however, that the last suggestion was ruled out on economical grounds.

The first section is devoted to prodromal and initial signs, the second section to symptomatology.

In certain parts, such as in the article on the disturbances of sleep, the author evidently speaks from first-hand knowledge; his account, for example, of the lethargic state in children is of value and enhances our knowledge of the clinical manifestations; in other parts, however, he quotes the assertions and opinions of many neurologists without exercising critical acumen as to their relative importance. In treating of the changes in the cerebro-spinal fluid, the author draws the distinction between the changes found in acute and chronic forms of the disease, which J. R. Perdrau and others have recently observed. The section on the course and after-results of the malady is illuminating and might with advantage have been expanded, for Prof. Stern has studied carefully the after-histories of his cases. The section on pathological anatomy is as imperfect as an exposition of the subject as are the few pages on epidemiology and the more diffuse section on pathogenesis. Prof. Stern does not mention the fundamental and early researches of McIntosh and Turnbull into the pathology of epidemic encephalitis and the experimental production of the disease in animals: he errs in quoting as authoritative certain work on "filter-passers" which subsequent investigation has failed to confirm. Throughout the book Prof. Stern maintains the thesis of the close association of epidemic encephalitis and influenza, but his arguments and the nature of the evidence adduced fail to decide, conclusively, this disputed question.

The monograph is illustrated by a few photographs of actual cases, and has been prepared with much industry, while those sections of the clinical portion of the book in which Prof. Stern records his own observations make it an important contribution to the study of this complex disease.

GEORGE MOORE.

A Portrait of George Moore in a Study of his Work. By JOHN FREEMAN. London: T. Werner Laurie. 1922. Pp. 283. 16*s*.

Mr. Moore is an artist who has felt obliged to write, and who has been unable to write without revealing himself. His admirers read his successive books partly as stories in themselves and partly as instalments of the story of Mr. Moore. To those admirers Mr. Freeman's close and clever study may be cordially recommended.

PRACTICAL PLANT BIOLOGY.

A Course of Elementary Lectures on the General Morphology and Physiology of Plants. By HENRY H. DIXON, Sc.D., F.R.S., Professor of Botany in the University of Dublin. London: Longmans, Green and Co. 1922. Pp. 291. 6*s*.

AN outstanding feature of this work is the remarkable amount of information conveyed within the limits of a modest volume. It consists of a series of lectures designed to illustrate the more important facts of morphology and physiology of plants in a manner suitable for medical and other students of elementary botany. Practical work is indicated at the close of each lecture. The types selected for study have been well chosen. Prof. Dixon deals first with unicellular organisms, and proceeds in an ascending series until the flowering plants are reached. While there are obvious difficulties in introducing minute forms of life to students unaccustomed to the use of the microscope, this order of study remains the logical one. Prof. Dixon sets an unusually high standard for medical students in treating so large a number of types in detail.

As a general introduction to the study of bacteria, Lectures VII. and VIII. may be cordially recommended. In his account of the ascent of the sap in Lecture XXV., the author gives without comment the cohesion theory with which his name is associated. This view has not received general acceptance, and quite recently Sir J. C. Bose has investigated the process and asserts that it is dependent on the active pulsation of living cells (*Nature*, April 29th, 1922, p. 561). The last three lectures are on general biological subjects, handled from a botanical standpoint. The concluding lecture on evolution and the theory of descent is one of the most fascinating chapters in the book and forms a fitting conclusion to a work which throughout is clear and lucid.

THE YEAR BOOK OF PHARMACY.

Edited by J. O. BRAITHWAITE and C. H. HAMPSHIRE, B.Sc., F.I.C., with the coöperation of THOS. STEPHENSON, F.R.S.E. London: J. and A. Churchill. 1922. Pp. 546. 12*s*. 6*d*.

THIS useful annual publication contains a summary of all scientific work bearing upon materia medica and pharmaceutics published during the year July 1st, 1921, to June 30th, 1922, and also a full report of all the papers read at the British Pharmaceutical Conference held during July, 1922, at Nottingham.

The chemical abstracts occupy the first 176 pages, and deal with alkaloids, animal products, bacteriological and clinical tests, colouring matters, essential oils, fats, fixed oils and waxes, glucosides, ferments and sugars, gums, balsams and resins, inorganic chemistry, organic chemistry, and plant analysis. Under the heading of Materia Medica, brief notes are given about all the important new remedies that have been introduced during the year; this is followed by new applications of remedies and abstracts of papers on pharmacognosy, pharmacology and therapeutics. Pharmacy occupies the next section, the abstracts being classed under Dispensing, Galenical Pharmacy, Pharmacopœia Revision Notes, and Notes and Formulæ.

The transactions of the British Pharmaceutical Conference, 1922, fill the remainder of the book, and include the interesting and thoughtful address of the President, Prof. H. G. Greenish, upon Pharmacognosy and the Pharmaceutical Curriculum. A new feature is to be found in the compilation of the index, which is now divided into two parts—a subject index and an index of authors.

LEOPOLD AUENBRUGGER'S INVENTUM NOVUM.

Faksimile nach der ersten Ausgabe, begleitet von der französischen Ubersetzung Corvisart's, der englischen von Forbes, der deutschen von Ungar. Herausgegeben und mit einer biographischen Skizze versehen von Dr. MAX NEUBURGER. Wien und Leipzig: Josef Safar. 1922. Pp. 95, 51, 36, 72. £1 1*s*. 3*d*.

IN THE LANCET of Nov. 18th last we published a letter from Dr. Arthur Davies drawing attention to the fact that the year 1922 was the bicentenary of Leopold Auenbrugger, to whose genius we practically owe the introduction of the practice of percussion as a means of estimating the condition of the thoracic organs, and giving some account of the modest little work a facsimile of which is now before us. It includes translations into French by Corvisart, into English by Sir John Forbes (1787–1861), and into German by S. Ungar.

Auenbrugger, who was born at Gratz in 1722 and who died in 1809, was physician to the Imperial and Royal Hospital of the Spanish nation at Vienna, and in that hospital he obtained the material for his conclusions, the results of seven years' observation and laborious and tedious exertions. The work is dated Dec. 31st, 1760, and appeared in 1761. Of its merits there is no need to speak nowadays; suffice it to say that Auenbrugger's work, together with the no less celebrated treatise on auscultation by Laennec (first published 1819), gave to modern medicine the only methods for accurate diagnosis of pulmonary conditions which existed until the discovery of X rays. Nothing is more easy than to be wise after the event, and it is not only astonishing that Auenbrugger did not hit upon auscultation, but that no one before his time had applied percussion as he did

to the discovery and explanation of conditions existing in the chest cavity. In the "scholium" or note to the seventeenth section of the book, he points out that his plan is exactly the same as that employed to ascertain how full a cask may be, for casks "dum vacua sunt, resonant in omni puncto; verum repleta tanto plus sonitu suo destituuntur, quanto magis volumen aeris in iis contenti fuerit imminutum." Like many another work of great price the book and its contents fell flat at publication; Auenbrugger himself, with the modesty of the truly great, had confessed that there were many defects to be remedied, which, however, careful observation would remedy, and it remained practically unknown until Corvisart in 1808 published a translation, later (1818) republished as an appendix to the third edition of his "Essay on the Diseases and Organic Lesions of the Heart and the Great Vessels." Forbes's translation into English appeared in 1824 and that of Ungar into German at Vienna in 1843. Auenbrugger's original treatise has the directness and simplicity which also characterise such works as the Aphorisms of Hippocrates or the Principia of Newton, and the aspiration which closes the book has certainly attained in full. Here are his very words: "Cedant haec miseris in solatium, veris autem medicinae cultoribus in incrementum artis. Quod opto!"

Dr. Max Neuburger's historical sketch has the fullness and accuracy which his readers have learned to expect from him. It is pleasing to see that even in these times the memory of one who worked diligently to benefit his fellows is kept green by the labours of a dweller in a land which in common with most of Europe has been sorely stricken.

INFANT FEEDING.

Practical Infant Feeding. By LEWIS WEBB HILL, M.D., Junior Assistant Physician to the Children's Hospital, Boston; Assistant in Pediatrics, Harvard Medical School. London and Philadelphia: W. B. Saunders Company. 1922. Pp. 483. 21*s.*

WE have recently been called upon to review a considerable number of books on infant feeding; many have been excellent, a few have been indifferent, none has been better than the present volume. Dr. Hill's writing is sane and scholarly; he gives a lucid survey of the various important theories which have influenced opinion on his subject, and he preserves a personal view which is both critical and logical. Many of the foods whose analysis he gives are products not used in this country; the result is an increase in tables without advantage to the British practitioner, but the volume as a whole is so well written and attractive that it should enjoy a deserved popularity in this country as well as on the other side of the Atlantic.

Infant Feeding. Fourth edition. By CLIFFORD G. GRULEE, A.M., M.D., LL.D., Associate Professor and Acting Head of the Department of Pediatrics at Rush Medical College; Consulting Pediatrician to Provident Hospital and the Home for Destitute Children; Lecturer on Child Hygiene, University of Chicago. London and Philadelphia: W. B. Saunders Company. 1922. Pp. 397. 22*s.* 6*d.*

Dr. Grulee is one of the enthusiastic followers of the doctrines of Finkelstein, and his book has, in previous editions, found interested readers in this country. The new edition is chiefly remarkable for reproductions of charts illustrating the theories of von Pirquet, which, according to the author, "give us the essence of infant feeding." Finding these charts in the form in which they are reproduced, scarcely intelligible, we have submitted them to others whose difficulty has not been less than our own. We hope that the author will in the future correct this mistake, which must at present greatly diminish the value of his volume.

JOURNALS.

THE December number of the TROPICAL DISEASES BULLETIN contains reviews of 167 scientific papers, as well as of nine recent books and more noteworthy publications.—P. W. Bassett-Smith contributes an important review which reveals the advances made during the last ten years in tracking down the ætiological factors of some fevers of short duration; pappataci, dengue, and tsutsugamushi disease, Rocky Mountain spotted fever, Oroya fever, and verruga peruviana are adequately dealt with.—Under the heading of medical zoology A. Alcock reviews a large number of communications, ranging from protozoology to entomology.—Clayton Lane epitomises recent publications on malaria, while Warrington Yorke reviews sleeping sickness, including the four most recent papers from German and French sources upon the therapeutic action of "Bayer 205."

MADRAS CENSUS REPORT, 1921.

(FROM OUR OWN CORRESPONDENT.)

THE 1921 census report for the Madras Presidency has just been issued in three volumes. Vol. I. contains the census officer's report proper, and Vol. II. the imperial and provincial tables of statistics, while Vol. III. is devoted to provincial tables which give populations of taluks and divisions. "The first attempt to number the people of Madras appears to have been made in the year 1822 when the population of the Presidency was returned as a little less than 13½ millions." The present census returns the population as 42,794,155, as compared with 41,870,160 in 1911, or a 2·2 per cent. increase in the decennium, in contrast to an 8·3 per cent. increase between 1901 and 1911. This is the lowest rate of increase recorded since the census of 1881, when the Presidency was suffering from the effects of the great famine of 1877–78. Nine of the 25 districts have now a population of over two millions, Malabar district heading the list with a total of over three millions.

The census officer gives a brief survey of factors, such as rainfall and prices of grain, which during the past decade have exerted an influence favourable or otherwise on the population, and then proceeds to discuss the question of public health. During the early years of the decade and up to 1917 conditions were generally favourable, for the latter year the Presidency birth-rate being 32·4 per mille and the death-rate 26·2. The influenza epidemic of 1918 caused the birth-rate to fall to 28·9; while the death-rate rose to 43·1 per mille. By means of graphs it is shown that the Deccan was worse affected than any other part of the Presidency.

General Vital Statistics.

In discussing vital statistics generally the question is asked why both birth- and death-rates in Madras are lower than those in any other part of India. The report tries to answer this question and discusses it at some length. It appears from the available figures that Madras contains a smaller proportion of married women of reproductive age, and the number of female deaths per 1000 male deaths during the age-periods 5–15 and 15–30 indicates that the mortality of women before and at child-bearing ages is considerably higher in Madras than in any other province. While the report agrees with the Sanitary Commissioner's opinion that defective registration is responsible for the low rates in a number of districts, yet the conclusion is reached that, generally speaking, the registration of births and deaths in the Presidency does not appear to be badly defective. This opinion is considerably divergent from that expressed in the report of the Director of Public Health for 1921–22. In his summing up the census officer concludes that the low birth- and death-rates of Madras as compared with the rates reported in certain other provinces of India is mainly due to (1) the smaller proportion of

married women at reproductive ages; (2) a great excess of deaths of women at these ages: (3) a constant flow of emigration on the part of males at these ages; and (4) possibly, in some measure, to constant in-breeding.

Influenza.

The influenza epidemic of 1918 is dealt with at some length. The increase in the actual number of deaths in that year was about 600,000, which is the number given by the Sanitary Commissioner in his report for 1918 as a moderate estimate of the number of victims. Most of the deaths were, of course, registered as "fevers," and in 16 out of the 27 districts the death-rate from fever rose over 100 per cent. above the average. In two of the ceded districts in the Deccan the increase was 1328·5 per cent. and 1410·0 per cent. respectively, the actual increase in the number of deaths being 55,000 and 41,000 in these two cases. The disease seems to have been considerably more fatal to females than to males in every district, and the common belief that the epidemic was particularly fatal to persons in the prime of life is corroborated by the figures given in a statement which compares the distribution of 1000 deaths by certain age-periods in the year 1918 with the average distribution of deaths over the five-year period, 1913–17. The great increase of deaths among persons at the prime of life naturally affected the birth-rate in succeeding years, and the birth-rate figure given for individual districts for the years 1918, 1919, and 1920 show conclusively that the birth-rate even in 1920 was still markedly below the average for 1913–17.

Infant Mortality.

The infant mortality-rate varied during the decade from 159 in 1920 to 231 in 1918, 1913 also showing the very high rate of 229. From the figures available in the report it is found that the highest rate of infant mortality is recorded in those districts which in other respects are generally considered among the most advanced—e.g., Madras, the Nilgiris, Tanjore, Tinnevelly, and Chingleput. It must be remembered that Madras is a densely populated overcrowded city, but as the report states, the conditions of city life do not "excuse Madras for showing in 1920 male and female infant mortality-rates of 290 and 275 when the rates for the Presidency are only 173 and 146." It is apparent from these figures that the child welfare scheme which has been in force in Madras city for the past five years has as yet merely touched the fringe of its problem.

Emigration.

An important factor affecting the population of the Presidency is emigration. On the balance of emigration and immigration Madras has lost one and a half millions of her natural population. The actual figure is probably much in excess of this, as complete returns were not available when the present report was written. "Thus summing up the conditions of the decade, we find that after a succession of comparably favourable years, the year 1918 was bad from the point of view of public health, from the point of view of failure of rain and consequent scarcity, and from the point of view of prices. The influenza epidemic of this year is the dominating influence of the decade; not only did it take a heavy toll of the people directly, but by causing the death of persons, especially women, in the prime of life, it has seriously affected the birth-rate in subsequent years. Moreover, scarcity combined with high prices led to extensive emigration. Thus it is not surprising that the census of 1921 gives results very little in advance of those of 1911 and that in some districts the population has gone back."

Density and Variation of Population.

A series of maps is given at the beginning of the report showing density of population, and variation in that density between 1911 and 1921, in each district, &c. The mean density of the Presidency is 297 to the square mile, and at this figure Madras stands fourth among the greater provinces of India, Bengal, the United Provinces, and Behar and Orissa taking the first three places on the list. The variation of the population during the decade was influenced by (1) the influenza epidemic and (2) the conditions of scarcity—in some places approaching famine—in the Agency, Ganjam, and the Deccan in 1919 and 1920. The figures given in the report for rainfall and area under irrigation show that the Deccani districts are terribly handicapped by the lack of rainfall and "to this natural handicap—or is it a direct consequence of it?—is added the almost perpetual scourge of epidemic diseases." These facts are reflected in the census figures. Kurnool has lost 2·2 per cent. in population during the decade, while Bellary district has lost as much as 11 per cent. In the table giving proportion of population per mille who live in towns, Madras stands second to Bombay with the figure of 124. Three places in the Presidency—Madras, Madura, and Trichinopoly—come within the Government of India's definition of a city, having a population over 100,000. The population of Madras has increased by only 1·6 per cent., that of Madura by 7·8 per cent., while that of Trichinopoly has fallen by 7·5 per cent. It was pointed out in the 1911 census report, and still holds good, that urban life appeals to the Tamils more than to the other peoples of the Presidency.

Age and Sex Distribution.

In the chapter on age the census officer has some interesting observations to make. In the first place he gives two diagrams which show most graphically how erratic the returns of age are, "the tendency to return the age as a round number, especially as a multiple of ten or five," being due to the fact that "the great majority of the population does not know when it was born or what its age is." Tables and diagrams are given comparing the present age-distribution with that in 1871, and at each subsequent census. For instance, the returns of 1871 and 1921 show a remarkable contrast. Not only was the number of children in 1871 greatly in excess of the number now, but at each age-period from 10–15 upwards, if there is a rise in 1871 there is a fall in 1921, and vice versa. In the loss of children in 1881 we see a consequence of the great famine of 1877–78, and it is remarkable how closely the curve of 1921 corresponds with that of 1881. In each of these years the population was just beginning to recover from a severe shock. A table giving the age- and sex-distribution per 10,000 persons in Madras city, other cities, towns, and villages, shows a great amount of immigration to the city of Madras and in a lesser degree to other towns and cities by persons of both sexes at ages 20–30. At the same time the overwhelming proportion of rural to total population is clearly marked by the almost exact resemblance between the age-distribution of the population of the whole Presidency and that of the rural population. As regards sex, Madras population has, since 1881, continued to show a preponderance of females to males, in this respect differing from most of the bigger provinces of India. From 1881–1911 there was a steady rise in the proportion of females, but during the last decade there was a slight set-back, the proportion falling from 1032 to 1028 females per 1000 males.

Other Details.

Other chapters in the report deal with the questions of literacy, language, civil conditions, infirmities, caste, tribe or race, and occupation and industries as revealed by the census figures, and are illustrated with the usual tables and graphs. The superintendent of census operations, in his introductory chapter, alludes to various difficulties experienced in making a census of a population which is largely illiterate. In addition, the Moplah rebellion and the non-coöperation movement were factors which could not be ignored, but all difficulties seem to have been successfully overcome, and the present census report may be said worthily to follow its predecessors.

THE LANCET.

LONDON: SATURDAY, JANUARY 13, 1923.

THE SURGERY OF INFANCY.

THERE is a widely held belief that the physiological economy of the child, and especially that of the infant, resents the affront offered by a surgical operation more acutely than does that of the adult. It is particularly regarded as a serious adventure to perform a laparotomy in an infant, where much intra-abdominal work is likely to be called for. To obtain a right perspective in this matter is not easy, for intestinal resections, anastomoses, and excisions of such viscera as the gall-bladder are rarely required in children under the same conditions as in adults. At first sight, the increased severity of these operations in the young would seem to be proved by the mortality following, for example, the resection of irreducible intussusception, or the division of the pyloric sphincter for hypertrophic stenosis. Dr. L. G. PARSONS and Mr. S. G. BARLING, elsewhere in this issue, relate their experiences of this latter operation and report a mortality of 48 per cent. for this seemingly simple procedure. These results, which are actually under, not over, the average mortality in skilled hands, would seem to justify us in taking a grave view of operations upon the very young. But a consideration of a wider operative field will not lend equal support to this view. Indeed, many surgeons would not subscribe to it: on the contrary, they would be ready to affirm that the young withstand operative insult to their physiology better than the fully grown, provided that certain precautions are scrupulously observed.

The conditions prevailing in operations upon small children are less favourable than in adults for several reasons which depend wholly upon their diminutive proportions compared with the operator and his instruments. The incision for a laparotomy has to be relatively longer than in the adult. This entails a larger exposure of the abdominal wall and the consequent larger heat-loss, whilst the severance of a greater number of sensory nerves is more conducive to shock. But of more concern than this is the fact that a larger area of peritoneal-covered surface is subjected to the nocuous influence of the manipulations necessary to carry out the intended procedure. Again, a loss of blood which is insignificant in an adult may easily be a measurably great fraction of the total blood volume of a child. Yet, despite these drawbacks, children recuperate after severe operations much better than adults because of the more than counterbalancing favourable factors. The child has a greater margin of reserve than the adult, his tissues are more capable of adaptation of function and more vigorous in repair, his hæmopoietic system exhibits greater activity, and his comparatively undifferentiated nervous system is less mobile and less unstable. The truth of this contention is the more evident if the course of events after operations for abdominal injuries in children be remembered. The recovery is often surprising in its occurrence and amazing in its rapidity.

Why, then, should Rammstedt's operation possess such a high mortality rate? There are several reasons, but the greatest of all is that the infant with hypertrophic stenosis is a starved animal with a resistance to trauma, to shock, to infection of the intestinal mucosa at a low ebb. The operation is usually performed under the worst possible circumstances, medical measures having been tried and found wanting. If the recommendation of Dr. PARSONS and Mr. BARLING to consider this disease a surgical one from the beginning were accepted generally, undoubtedly the mortality would fall considerably. These two observers in seven consecutive private patients carried out the operation without a death, an indication of the good results to be anticipated in the hands of practitioners who have ceased to regard the disease as a primarily medical one. Division of the pyloric muscle ring is the ideal procedure for congenital hypertrophic stenosis. It causes a relaxation of the sphincter which lasts just long enough for a cure to be effected; the two cut ends after some months are usually found to have united by a simple linear scar whenever an opportunity has occurred to make such observation. This temporary relief is all that is desirable, for, invariably, with the passage of time, in children who survive early infancy, the normal relation between the strength and size of the sphincteric and general gastric musculature is established. The factors of success in operating upon young children are above all gentleness in the manipulation of their delicate tissues; speed, if this does not entail roughness; the avoidance of the loss of one drop of blood more than is necessary; and an inflexible determination to diminish the intra-abdominal trauma and the exposure of the viscera to a minimum, whilst every possible heat unit in the child's body is conserved.

HOSPITAL REPORTS.

WE reviewed recently the latest volume of the St. Bartholomew's Hospital Reports, which have appeared yearly, except for a short intermission during the war, since 1865. Similar reports have been published regularly by Guy's Hospital since 1836, and by other hospitals for longer or shorter periods, though in some cases they have consisted only of statistical tables. It may be doubted whether the publication of tables by individual hospitals serves any useful purpose, and we notice that they do not find a place in the volume now issued by St. Bartholomew's Hospital, but the whole question of the value of hospital reports is worth a little consideration. Their appearance has been taken for granted, while their contents seem to be fortuitous. Many important contributions to medicine and surgery, under names that have now become historic, have first made their appearance in such reports, if only because, at the times when the publications were instituted, medical and surgical periodicals were largely non-existent, and the younger men, whether attached to the great hospitals or enjoying good opportunities for acquiring experience, had far fewer opportunities to put their work before their colleagues. At the present time work of merit can find publication in one of the general or special medical journals, so that at first sight the necessity seems no longer to exist for the multiplication of volumes from the separate hospitals. But we do not feel at all clear upon this point. Even if the records of a great hospital tend to be read only by past students of the school responsible for their issue, they have an excellent *raison-d'être*, while in hospital reports there is a flexibility which may be absent at any particular time from the overcrowded pages of a medical journal. We have noted frequently that when some main statement of principle is being enunciated in our own columns, a reference, for the sake of the details, is given to a volume

of hospital reports. This being so, no one need hesitate to give of his best to be "buried" in a volume of hospital reports, because resurrection is a certainty when the article calls for it.

But if hospital reports are to maintain a high standard, the traditional pride in their publication must be fostered. This difficulty has been met at the Mayo Clinic, for example, by the yearly publication of a volume containing a collection of papers which have already appeared in many different journals, but which had their inspiration from the Clinic. There would, however, be no need for any British medical school, giving signs of active life, to look outside its own organisation for the production of a yearly volume of new and valuable matter, which would be an index of the activities yearly, nay hourly, being carried on within its hospital. There will always be subjects for literary treatment, whether historical, statistical, biographical, clinical, or purely scientific, worthy to be printed in the archives of the institution, though some of them would be unsuitable for publication elsewhere for numerous reasons, some of which will immediately occur to the mind. A valuable article may, moreover, be offered to the hospital reports purely owing to the writer's loyalty to his own school, though he knows that it would be eagerly accepted elsewhere; in such a case references in literature of a wider appeal will call attention to it, and incidentally to the volume in which it appears. What has to be recognised is that only loyalty on the part of past members of a school will enable hospital reports to maintain a worthy existence. The matter must be supplied for the most part by those actively engaged on the staff of the hospital; the subscriptions must be furnished largely by old students who have gone out into the world, but who wish to maintain some link of communication with the school that bred them. We are glad to see that St. Bartholomew's is still able to maintain a high standard in its reports in spite of present difficulties introduced by the costs of production. The current issue, as we said in our review, is the first for which the medical school is responsible, former issues having been edited and published by a committee made up of members of the staff. We learn that previous to the appearance of this present volume there was a question as to whether reports should be published at all, but publication was finally decided upon. The question is not so much whether hospital reports should be published, but as to what material they should contain. The bulk of the volume will consist of summaries of the work done in the hospital along some definite lines, the articles recording with circumstance and detail the experiences which have been met with in the institution, and the general lessons to be drawn from them. For over eighty years the Guy's Hospital Reports have provided an admirable example of this form of report, and under the editorship of Dr. A. F. HURST the standard is steadily maintained. Statistical tables must, of course, form a proportion of these records, but we doubt their scientific value. It is not the bare figures that are wanted, but the reasons for their significance, and these should be put forward with every measure of proof that can be taken.

There is a side to the records of a hospital which it seems to us might be developed. Most people know of the existence of, and some have even read, the old monastic chronicles of abbeys and priories, those, for instance, of St. Albans, Jocelin of Brakelond's work dealing with the Abbacy of Samson, the Chronicles of Glastonbury and Lanercost. In such chronicles we have recorded brilliant pictures of the working of a great society, of social customs, estate matters, agriculture, Poor-law and so on, which bring the lives of our forefather vividly before us. Would it not be possible for a hospital to keep a modern chronicle, and issue portions of such chronicle as a hospital report? Most large hospitals have an interesting social story. Medical and surgical matters, also, need not always be considered from the purely professional point of view, but as matters affecting our fellow creatures and from the patient's point of view as well as that of the staff. Papers on the economics of the hospital written by the steward or bursar should find regular acceptance—the hard-worked and resisting official should be goaded to supply them. All who knew him can imagine what interesting matter the late steward of St. Bartholomew's Hospital could have put upon paper, and the contents of a book recently published by the chairman of the London Hospital would have brightened up the records of that great institution in a wonderful way. Hospital reports in their present form are read by but few—perhaps by none of those who subscribe to hospital funds. Far more persons would take an interest in hospitals if the reports were more direct and simple in their appeal, and judicious excerpts from the minutes of governors' meetings, revealing the nursing and domestic side of hospital life might lead to valuable pecuniary response. The working of a great hospital is of abiding interest, and we believe that, if some course such as we suggest were adopted, volumes of hospital reports, if not ranking among "best sellers," would appeal to many persons who do not now buy them and that thereby hospital incomes might be increased.

CARBON MONOXIDE IN COAL-GAS.

THE fatal results of leakage from a main supply pipe in Bethnal Green have recalled public attention to the lethal properties of coal-gas. It is perfectly well known that carbon monoxide is the poisonous constituent. The Gas Regulation Act of 1920 gave the supplying companies no greater latitude than was enjoyed previously in regard to the percentage of carbon monoxide in the gas supplied. A departmental committee, appointed in 1898 by the Home Office, had recommended that the percentage should be limited to 12, but no legislative action was ever taken to give effect to this recommendation. The Local Government Board, however, made it a practice in approving loans to local authorities to require that the gas supplied should not contain more than 15 per cent., although no steps were taken to ensure that this limit was adhered to. What the Gas Regulation Act did was to give the Board of Trade authority to depart from previous practice and to prescribe a limit, if, after due inquiry, it thought wise to do so. A committee, of which Sir WILLIAM PEARCE was chairman, and Dr. T. CARNWATH the medical member, came to the conclusion, after careful consideration, that—on the evidence at present available and having regard to what is likely to be the trend of development in the gas industry during the immediate future—it was inadvisable to impose any limit. The departments concerned, however, were put on their guard carefully to watch the situation so that, if the freedom from limitation were accompanied by unexpectedly unfavourable results, the attention of Parliament should again be directed to the matter.

There is an impression abroad that gas companies have availed themselves liberally of their right to admix water-gas. What are the facts? The gas supplied by the South Metropolitan Gas Company contains no admixture of water-gas, and, speaking for the larger gas companies generally, there has been no material change of practice as regards the proportion of carbon monoxide supplied during recent years. The proportion of carbon monoxide in the gas supplied by the Gas, Light and Coke Company

has averaged about 15 per cent. for the last twenty years. That supplied in 1919 gave an average percentage of 15·17 for the year; the Bethnal Green accident occurred on the night of Dec. 28th/29th—on the 28th the percentage was 14·8, and on the 29th it was 15·0. There can be little doubt that for several hours before the discovery was made, the concentration of gas in the air of the room in which the deaths occurred was so great that the issue would have been fatal even had the gas been "straight" coal-gas containing only 8 per cent. of carbon monoxide.

The suggestion that the gas now supplied has not such a characteristic smell as formerly seems to be devoid of foundation, although it may have been true to some extent of those supplies from which toluene and benzene were extracted during the war. The characteristic smell of coal-gas is due in the main to heavy hydrocarbons and to certain little known sulphur and nitrogen compounds; the smell of carburetted water-gas is even more penetrating than that of ordinary coal-gas. By the Gas Companies (Removal of Sulphur Restrictions) Act, 1906, the restrictions with regard to the presence in gas of sulphur compounds, other than sulphuretted hydrogen, were abolished. In practice, however, gas companies are careful to remove sulphur as completely as possible owing to its injurious effect on pipes and fittings. The great bulk of the sulphur in crude gas is present in the form of sulphuretted hydrogen; of the remainder, which averages about 40 gr. per 100 cub. ft., some 34 gr. are in the form of carbon bisulphide and 6 gr. in the form of obscure compounds which cannot be removed by any known method. Opinion in this country is opposed to the addition of any extraneous substance to give to coal-gas a tell-tale smell. Its peculiar odour is now so well known as a danger signal that the substitution of another odour would be unwise. Such a substance would anyhow be hard to find, for it must be easily perceptible in low dilution and the smell should vary with its concentration in the atmosphere and disappear as soon as the leak was remedied and the escaped gas dissipated. Further, it should be insoluble in water and should not be readily removed by earth or other adsorbent substance. As the outcome of experiments carried on in America by KATZ and ALLISON, under the auspices of the Bureau of Mines, certain mercaptans and pyridine were suggested as stenches, but it is impossible without extensive trial to say whether they would be found of practical value.

However much we may regret the occasional cases of accidental gas poisoning, it is difficult to see how they can be avoided by prescribing its composition. Careful inquiry into 114 fatal cases of gas poisoning during the past year has shown that in only 22 cases did the percentage of carbon monoxide exceed 16. In no case did it exceed 20 per cent. It would be idle to deny that an increase in the proportion of water-gas must almost necessarily be accompanied by somewhat greater risk to the consumer. From the medical point of view the question for consideration is whether this increased risk is more than counterbalanced by the advantage of a clearer atmosphere. Much of the risk can be obviated by more careful attention to mains and fittings and by greater promptitude in the notification of escapes. In Bethnal Green the smell of gas was clearly perceptible on Dec. 28th, and an occupant of one of the houses wrote to the gas company complaining of the smell. If this information had been telephoned, or notified to the police, the tragedy might have been averted.

INDEX TO "THE LANCET," VOL. II., 1922.

THE Index and Title-page to Vol. II., 1922, which was completed with the issue of Dec. 30th, will shortly be published. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2.

Annotations.

"Ne quid nimis."

COMPENSATED LAMENESS.

THE 15-mile flat race recently organised by the proprietors of the *Star* for men with one or more artificial lower limbs was a remarkable object-lesson of compensated disability. We understand that Mr. F. G. Ernst, the orthopædic mechanician, originated the idea of such a walking race. Out of 300 or more entries 264 actually started and of these 196 finished the course. We have been favoured with a complete list of those who finished, with the time occupied, and an indication of the type of limb worn. The winner completed in just under three hours—that is, an average speed of over five miles an hour—the second being less than five minutes behind. Both of these men were below-knee amputations, the stump being about ten inches long, and both were wearing "Rowley" wooden limbs with ball-bearing joints and sponge-rubber feet. Ten of the leading group of walkers exceeded a speed of six miles an hour for some part of the course, and the winner covered the first mile and a half in 14 minutes 5 seconds. There were about an equal number of above-knee and below-knee amputations among the walkers, and naturally most of the early places were taken by men who still possessed a natural knee-joint, but the forty-eighth place, with the excellent time of 3 hours 33 minutes, was taken by a man with an amputation above the knee, wearing a "Desoutter" metal limb. The difference was not, however, very great, for taking a comparable group of 25 men wearing limbs of the same make, the average time of 15 below-knee amputations was 3 hours 42¼ minutes, and of 10 above-knee amputations 4 hours 14½ minutes. A man with double amputation below the knee came in eighty-eighth in the astonishing time of 3 hours 49 minutes; he was wearing two "Grossmith" wooden legs. We are informed that another double amputation was making even better time until chafed by a strap near the finish. Among the last six to arrive were two men with disarticulation at the hip-joint, and a third with a stump so short as to require the misnamed "tilting-table," who, in spite of this major disability, had covered the 15 miles in five hours. Of these one was wearing a "Grossmith" wooden, one an "Ernst" wooden, and the third a "Hanger" light metal limb. A lad of 15 excited enthusiasm by coming in at 4 hours 29 minutes on a wooden peg leg. In regard to the apparatus responsible for these remarkable results, even a casual glance at the records suggests that different makes and types of limb are very evenly distributed over the race, and the opinion is confirmed that any prejudice against wooden limbs is not justified in fact. Metal limbs have only been issued in any quantity during the last year or so. The claim is made for the heavier wooden limb that advantage is gained from the "pendulum" action, owing to which the foot swings forward by its own weight with less of conscious exertion—and there was nothing in the race to refute this claim. It is, however, a little difficult from the records to ascertain exactly the proportion of wooden and metal limbs worn, since some of the makers supply both. In 18 cases the nature of the limb is not stated at all, and of the remaining 188, as far as we have been able to ascertain, not more than 30 were of metal. A few were wearing the new Desoutter limb, which has a wooden socket for the reception of the stump, the remainder being of the standard metal pattern. To walk 15 miles is an achievement in itself; to do so in five hours with a disarticulated hip-joint on a course with a long up-hill rise at the finish is an exhibition of endurance and pluck which must command respect for both the human and the physical element. It was generally admitted that the majority of the men suffered little or no bad effects from their

strenuous walk. Most of those who fell out did so as a result of mishap either to artificial leg or boot; one hero who fell unconscious by the way and was picked up by two official timekeepers, insisted on resuming his course when he had rallied. It would be interesting still further to analyse the results into short, medium, and long stumps, but the material is hardly sufficient for this purpose. No more can fairly be said in regard to the advantage of different types of limb, as the results of such a race would be affected by the probability that only those would enter who had confidence in limbs which they found useful.

THE SIGNIFICANCE OF STRIÆ ATROPHICÆ.

Striæ atrophicæ are common pathological objects attracting little attention, inasmuch as they cause the patient no distress, and from the site of their occurrence give rise to slight disfigurement. Their formation is generally considered satisfactorily explained on the theory that they result from a previous distension and stretching of the skin. A very unusual example is recorded by MM. E. Rist and P. Jacob in the *Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris* for Dec. 14th, 1922. The patient was a girl of 17, suffering from tuberculosis of the right lung. For this a right-sided artificial pneumothorax was established in February, 1922, about three months after the apparent onset of the disease. A week later numerous striæ atrophicæ were observed situated on the left side of the chest, the left loin, and buttock. They were particularly numerous over the lower two-thirds of the left thorax and in the left lumbar region, and ran in a direction parallel with the ribs. In the following August they still presented the reddish-purple colour of recent striæ, but when the case was exhibited in December they were of a pale rose colour, with the typical mother-of-pearl appearance. Mr. Balzer has previously pointed out that striæ atrophicæ may appear over the chest in cases of pleural effusion or of pneumothorax, usually on the homolateral side, rarely on the contralateral side, as the result of a slow and progressive stretching of the skin. MM. Troisier and Menetrier have shown that the histological changes consist of an elongation and stretching of the cutaneous elastic fibres, with here and there rupture. In the case here recorded the establishment and maintenance of the right-sided pneumothorax resulted in a secondary enlargement of the left side of the chest, yet the striæ appeared so rapidly that no marked distension could have taken place when they were noted, and further, enlargement of the thoracic cavity could hardly account for their formation in the skin of the shoulder and buttock. The authors put forward the suggestion that in some instances there may be a specific predisposition to the development of striæ atrophicæ, a peculiar condition of fragility of the skin. Another explanation, however, offers itself, that the striæ result from external pressure as opposed to internal distension. In support of this theory certain examples may be quoted. In a large proportion of men who have served in the army striæ atrophicæ are seen over the anterior aspect of the shoulders, corresponding in position with the shoulder-straps of the army pack, and in nearly every instance in which these are present the man wore a pack during his service. Again, a girl of 17, also suffering from pulmonary tuberculosis, showed striæ atrophicæ over the back, just below the ribs on the left side. They were of bluish-red colour, indicating a recent formation. No history of illness confining the patient to bed, and no habit of sleeping on one side of the body could be obtained, whilst the unilateral distribution seemed to negative clothing as the provocative agent. It was found that the patient had slept two nights previously on a "hair-slide," and on waking had noticed that her back felt sore. The correspondence between the size and shape of the "hair-slide" and the marks on the patient's back left no doubt as to their origin. It is also a possibility that the striæ that develop upon an abdomen which has suffered enlargement are similarly caused by external pressure creasing the skin, due to the constricting effect of clothing or of binders, and that in those rare instances of parous women in whom no striæ are seen the external pressure effects of clothing were slight. It would be interesting to know whether in the case recorded by MM. Rist and Jacob any history of external pressure could be found, such as the position adopted on lying in bed, or the constriction of clothing, to account for the contralateral appearance of the striæ atrophicæ.

THE EFFICIENCY OF LINEN WEAVERS.

THE investigations of the Industrial Fatigue Research Board continue to throw light upon the way in which conditions of work, by influencing the human factor, affect productivity. The most recent report deals with linen weaving[1]; in it attention is particularly directed to atmospheric conditions with regard to temperature and humidity. In weaving the loom rather than the weaver determines the pace, which is only limited by the tendency of threads to break when the weaver has to tie up the broken ends. The thread of flax from which linen is woven, like that of cotton, weaves best—i.e., breaks least often—in a warm humid atmosphere; but the activities of the weavers are adversely affected when the warmth and humidity are such that they perspire freely as they work. There is thus an antagonism between the weavers and their materials; and the result of the inquiry shows that the economic limit for linen weaving is reached at a wet bulb of 73° F., above and below which productivity falls off. Two other factors were also investigated—viz., lighting and hours of work. Artificial light, even though the actual illumination (between 5 and 8 foot-candles) was good, was found, when compared with daylight, to reduce output by 11 per cent. No definite conclusions as to the optimum hours of work could be drawn from the shortening of hours, which took place owing to trade depression, from 45 per week to 40, then to 36, and finally to 27, owing to the complexity of the factors concerned, which were largely psychological. The report, which is one of a series devoted to the textile industries, is interesting and gains much from conciseness in writing.

CARDIAC TREATMENT AT A BOHEMIAN SPA.

THE recent medical congress at Franzensbad in Czecho-Slovakia (or Bohemia as we may still call the country for the sake of medical continuity) attracted medical men from all parts of Austria, Bohemia, and Germany, and led to a useful exchange of views upon the scientific basis of cardiac treatment. R. Schmidt (Prague) spoke of the effect of "drop-heart" in lowering resistance to infection, intoxication, and narcosis. Bradycardia he found often associated with gastric disorder and albuminuria. He still upheld the existence of a uric-acid diathesis, which played a large part in the production of arterio-sclerosis. H. E. Hering (Cologne), while admitting the influence of extra-cardiac impulses upon the heart, gave himself out as a frank adherent of the myogenic origin of cardiac failure. Respiratory irregularity of the pulse, normal in the young, he regarded as of serious import in older persons. In cases of increased blood pressure associated with tachycardia, in which cold carbonic-acid baths proved helpful, doubtless the balance of internal secretion was at fault. O. Minkovski (Breslau) dealt further with the very intimate relation between metabolism and circulatory disorders. Carbohydrates were of notable value as rapid sources of cardiac energy, and injections of glucose had proved helpful in cases of insufficiency. An abnormally small heart was often due to pulmonary tuberculosis, hypertrophy

[1] A Study of Efficiency in Fine Linen Weaving. H. C. Weston. Industrial Fatigue Research Board. Report No. 20. 1922. 1s. 6d.

to arterio-sclerosis, renal sclerosis, or gout. He regarded obesity as becoming pathological only when it occasioned cardiac disturbance, fatty accretion around the heart having little direct effect on the circulation. Heart attacks in the gouty were probably due to toxic causes acting on the myocardium, not necessarily irremediable in nature. K. Zörkendörfer (Prague) called attention to the installation in Franzensbad of concentrated sodium-sulphate springs, the water being isotonic with body fluids; these had a useful alterative and osmotic influence on the body. The low conductivity of the peat baths permitted the application of high temperatures to the skin. J. Pál (Vienna), discussing the pathology of hypertonus of heart and arteries, expressed doubt of the value of iodine except in syphilitic cases, sodium rhodanide (rhodanol) being indicated otherwise. In the differential diagnosis of cardiac defects F. Volhard (Halle) urged a plea for greater attention to functional capacity rather than auscultatory signs, the loudness of a murmur demonstrably bearing no relation to the amount of organic defect. The state of the hepatic circulation and venous pulsation in the neck were nevertheless of importance. v. Jaksch (Prague), dealing with the result of infections upon the heart, extolled the value of digitalis combined with calcium followed by injections of sugar, camphor, or ether, and later by the use of cold carbonic-acid baths. Altogether the conference was a practical one, and drew useful attention to the new developments of a famous centre in cardiac treatment.

CENTRAL EUROPEAN UNIVERSITIES AFTER THE WAR.[1]

A VISIT of a party of members of the University of Oxford to the chief seats of learning of the five central European countries during the summer term of last year had for its main object to obtain personal insight into the conditions prevailing among students of their own age at educational centres situated in war-ruined capitals. The party further determined to conduct propaganda on behalf of European students in Oxford, and, if possible, through a wider circle. Such a movement would, it was hoped, establish a precedent in English universities under which definite attempts could be made to promote understanding between the rising generations of European countries. Captain C. P. Blacker, of Balliol College, Oxford, who conducted the expedition, has now set down in a pamphlet, with the above title, the results of the tour, and makes a moving appeal on behalf of the groups which he visited with his party.

The conditions in Austria, as seen from the student's eye, testify to the devastating effects of the war. In Vienna the Viennese of the upper and middle class have given place to foreigners who can profit by the exchange and make a public appearance in the former centres of pleasure, while the natives try to hide their poverty by self-effacement. Some, including prominent university professors, have found suicide the only way out of their miseries. What applies to Austria in regard to poverty applies, more or less, to the other countries visited—namely, Hungary, Czecho-Slovakia, Poland, and Germany. The effects of post-war conditions on child life is strikingly shown by a comparison of pre-war with present records in certain schools, not the poorest, of Berlin. Out of 607 children, 360 at the age of 14 were incapable of undertaking work of anything like an exacting nature, while the pre-war returns show only 8 per cent. incapable of undertaking such work. But, despite the horrible environments, the students of the universities show everywhere keenness for work, and while fighting the wolf from the door they find means, with the help of the European Student Relief, for carrying on their education under the most adverse conditions. This applies in measure to women as well as to men. The students undertake the most menial forms of labour to achieve their purpose, and self-help and coöperative societies are springing up everywhere. A remarkable instance, which, as the author remarks, deserves the closest attention of the English undergraduate, is the Hungarian "Centrum Students' Society," which has had an amazing career. Founded in January, 1920, with a capital of Kr.4500, this sum was increased in six months to Kr.500,000. In 1921 the value of what was sold amounted to Kr.21,000,000, and the turnover has now quadrupled, notwithstanding the decrease in money value by one half. At the beginning of 1920 there was a single shop. Now there are laundry, tailoring, shoemaking and repairing establishments, a clothes shop, two milk shops, a barber's shop, and a grocery, while other schemes are being developed, including the production of an undergraduate newspaper. Everything can be bought 30 per cent. cheaper than in any of the town shops.

The book ends with an appeal for all countries to take a keener interest in each other, an interest which seems already to be springing up among students on the continent and which, for want of a better term, has been called "generation consciousness." To foster this among students it is suggested that a certain amount of foreign travel and a knowledge of foreign countries should become a recognised part of a university man's equipment. The idea is an excellent one, and Captain Blacker has written a valuable pamphlet, while it is interesting to note that the whole trip with which the author deals could have been made by any individual member for £20.

[1] Gloucester: Crypt House Press. 1922. Pp. 64.

REPRODUCTION IN CELL-COMMUNITIES.

IT is known that the rate of multiplication of bacteria is for a time proportional to the concentration of the food material and to the number of the organisms, and that later the multiplication becomes slower and finally stops. The inference seems to be that the multiplication is governed by the amount of food available. T. Brailsford Robertson,[1] however, finds that there are other factors to be considered. When two individual infusoria are isolated into the same drop of culture-medium, the rate of reproduction of new cells is much more rapid than it is when a single individual is isolated into a drop of the same size. It may be 16 times as great. The author calls this the "allelocatalytic effect." He finds that distilled water, to which a proper reaction and tonicity have been communicated by the addition of a buffer mixture of phosphates, and which has been densely populated by dividing infusoria, contains a substance which enhances the multiplicative rate of isolated infusoria. The autocatalytic character of reproduction in cultures of infusoria is attributed in part to the inherent capacity of each cell to reproduce itself, due to the presence within it of a catalyser capable of effecting protoplasmic synthesis, and in part to the shedding of a catalyser into the surrounding medium, through the agency of which the cells are enabled to facilitate each other's reproduction. An old culture-medium contains no substances which are toxic for infusoria, nor does it retard the multiplication of infusoria isolated into it from young cultures. Nevertheless, infusoria from old cultures develop much more slowly in old culture fluid than in fresh isotonic hay infusion, and the maximal resultant population is very scanty. During the lag period which succeeds isolation of an infusorian into a fresh culture-medium, and before the first division has occurred, the organism is insusceptible to the action of agents which accelerate multiplication. The acceleration of reproductive rate is observable only after division of the isolated cell. The accelerative agent in cellular multiplication originates in the nucleus, and the autocatalytic time-relations which distinguish all types of growth are referable to the fact that nuclear synthesis is autocatalysed. Brailsford Robertson suggests that, during the periods

[1] The Journal of Physiology, vol. lvi., No. 6, 1922.

between nuclear divisions, each nucleus retains the charge of autocatalyst with which it was originally provided, and adds to it in the course of nuclear synthesis which is rendered possible by its presence. At the next division, the autocatalyst is shared between the nuclear materials and the surrounding medium in a proportion determined in part by its affinities for chemical substances within the nucleus. At the end of this redistribution the autocatalyst stands in equilibrium between the external solvent medium, on the one hand, and on the other hand the nuclear substances with which it is combined, or in which it dissolves. The nuclear membrane is then re-formed, and the autocatalyst within the nucleus is again shut off from disposal.

CONGENITAL OSTEO-SCLEROSIS.

Dr. Ralph K. Ghormey,[1] of the orthopædic service of the surgical department of the Johns Hopkins Hospital, reports the following unique case. A boy, aged 8, was brought to hospital for pain in the left hip and limp. On examination he presented slight atrophy of the left thigh and calf, and in the recumbent position there was about ½ cm. of apparent shortening of the left leg. Voluntary as well as passive movements of the left hip revealed slightly less abduction than on the right. There was a slight decrease in hyperextension of the leg. Skiagrams of the pelvis showed a curiously dense appearance of the bones, and a similar condition was found throughout the skeleton. The vertebral bodies showed a marked density at either pole, there was thickening of the cortex of the ribs and this was more definite in the case of all the long bones, most marked in the femora and humeri and greater in the proximal portion than in the distal extremity of these bones. The skull was thicker than normal. Skiagrams of the parents showed that while the mother's bones were normal, practically the same condition existed in the father as in the child. The Wassermann reaction was negative both in the parents and the child. Although there are several cases on record in which osteo-sclerosis has been found at autopsy, some of which cases were congenital and others were associated with changes in the blood-forming organs, especially leukæmia, Dr. Ghormey has been unable to find any cases similar to his own in the living person. Most writers are of opinion that the sclerosis is secondary to an irritation connected with the morbid process in the blood. In the present case, however, there was a definitely inherited condition not related to any demonstrable metabolic disturbance.

SPONTANEOUS DEGRADATION OF CULTURE.

UNDER this title Prof. Tenney L. Davis, of the Massachusetts Institute of Technology, puts before the readers of *Science Progress* a theory of the rise and fall of cultural communities. Progress of culture comes about—this is his thesis—through changes of idea-system, which in turn are accomplished by the ideas of individuals. The stimulus to the individual comes from his difficulties, and the most fertile period in the cultural development of Europe was "a period of vice, disease, brigandage, pride, pomp, and superstition, a time when often men dared scarcely call their names their own." As Prof. Davis says, individuals get bright ideas as the result of being subject to predicaments; but there is a golden mean, and a supply of stimulating predicaments must be balanced by that organisation and regulation which allows the thinker a certain security of nourishment and undisturbed sleep. The civilised group thus devises means for the easier spread of civilisation, whilst the complexity of the group increases the variety of predicaments to which an individual can be subjected, so promoting changes in the group's idea-system. So far the argument contains nothing novel, as Prof. Davis remarks, for it is a truism of history that great civilisations have arisen not only where something more than the needs of existence could be satisfied, but where even those needs demanded creative thought: neither a frozen waste nor a lotus-eaters' paradise can produce a high culture. Moreover, that the sublimation of suppressed disharmonious impulses may result in genius is as much a part of modern theory as the better known conception that the suppression may lead to neurosis; the "predicaments" of Prof. Davis are the "conflicts" of the psychologists. The fall of civilisations has been ascribed to luxury and ease, but Prof. Davis takes the view that organisation, police and prohibition, and the like, abolish predicaments, and thus cut off the growth of culture. He regards this spontaneous degradation as inevitable, and makes the philosophical admission that to urge against the suicide of culture would be anarchy. But the abundance of individual neurotic manifestations under modern culture, even if they are sometimes replaced by those of genius, is a mark of the abundance of conflict, or predicament: and those who fear the collapse of European culture will scarcely admit that lack of predicaments is an element in the situation. Why civilisations fall is an enticing speculation. If Prof. Davis is right, and culture comes to an end by the efficiency of its organisation, then we may find comfort and security in a survey of world politics. But perhaps Prof. Davis has not really solved what is the greatest problem in history.

AN EXPERIMENTAL STUDY OF THE CIRCULATORY FAILURE IN PERITONITIS.

FOR many years it has generally been assumed that heart failure in peritonitis is due to the action of toxins, absorbed from the abdominal cavity, on the vaso-motor centre. The work on which this view was based was chiefly that of Romberg, Pässler, and Heineke, whose publications appeared in 1899 and 1900. For some years physiologists have been sceptical as to the soundness of this view, and a recent experimental study, carried out at the Karolinska Institute in Stockholm by Dr. Herbert Olivecrona,[1] has justified this scepticism. Working with rabbits, cats, and dogs, in which peritonitis was induced, he investigated the plasma and blood volume by the vital red method, using vital red obtained from the British Medical Research Council. A known quantity of the dye was injected intravenously, and after a certain interval the concentration of the dye in the plasma was estimated with the help of the Dubosq colorimeter. The burden of the thesis is that the vaso-motor centre retains its activity even under the most adverse circumstances almost to the time of death, and in the vast majority of cases the blood pressure remains normal during the earlier stages. But early in the disease, and long before there is any serious fall of the blood pressure or decrease in the vaso-motor reflexes, there is a reduction of the volume of the blood, and this reduction is progressive and considerable. From these and other observations it is concluded that this progressive loss of blood from the effective circulation must be an important factor in bringing about the circulatory disturbances in peritonitis. As in the case of secondary traumatic shock, it is probable that the reduction of the blood volume is due to dilatation and increased permeability of the capillaries, with stagnation of blood in the dilated capillary areas, and filtration of plasma through the injured capillary walls. Dr. Olivecrona's review of the methods at present practised in combating the circulatory disturbances in peritonitis is the reverse of laudatory. The administration of vaso-constrictor drugs is, he thinks, useless, if not actually harmful. If, as is very probably the case, the arteries in peritonitis are already constricted in order to compensate for the reduced blood volume,

[1] Bulletin of the Johns Hopkins Hospital, December, 1922.

[1] Acta Chir. Scand., 1922, vol. liv., fasc. vi.

further vaso-constriction by such drugs as adrenalin may cause a decreased supply of blood to the tissues, and thus promote asphyxia. As Lamson and Roca have shown, the addition of adrenalin to a saline solution injected intravenously greatly accelerates its elimination from the blood-stream. There is little point in such intravenous injections of saline solution, for it leaves the circulation rapidly, and merely clogs the organism, giving rise to œdema and pulmonary complications. The intravenous injection of solutions of colloids, such as gum acacia, is also of doubtful value, and at present the transfusion of blood seems the most rational treatment of the circulatory disturbances in peritonitis.

THE DISTRIBUTION OF TRYPANOSOMES.

Trypanosoma rhodesiense, originally described in 1910 by Stephens and Fantham as a species distinct from *T. gambiense*, is the cause of a peculiarly virulent form of sleeping sickness in Nyasaland, Tanganyika Territory, Northern Rhodesia, and Portuguese East Africa. Not only are the clinical manifestations produced by this parasite more severe than are *T. gambiense* infections, but also it is subserved as an intermediary host by *Glossina morsitans*, the tsetse which ordinarily preys upon the big game. Up till recently, as stated, the parasite was regarded as having a peculiarly restricted Central African distribution, but now, as a result of an important communication by Dr. R. G. Archibald, director of the Wellcome Tropical Research Laboratories in Khartoum, our views on this matter will have to undergo considerable alteration, for, as reported by him in the *Annals of Tropical Medicine and Parasitology* (vol. xvi., No. 3), three cases of *T. rhodesiense* infection have been discovered in the Bahr-el-Ghazal Province of the Sudan. In this region both *Glossina morsitans* and *G. fuscipes* are abundant, and more especially in Tembura, the particular district in which the cases occurred. Inoculation into gerbils of the gland juice procured by aspiration from one of these men caused an intense infection, of which quite a large proportion represented the posterior nucleated forms so characteristic of the Rhodesian parasite.

THE PINK DISEASE.

ACCORDING to Dr. John Zahorsky,[1] who records four illustrative cases in children, aged from 15 months to 6 years, the affection variously designated as "the pink disease," "erythrœdema," or "acrodynia" has been known in Australia for a quarter of a century, but it was not until 1914 that the first description of it was given by H. Swift, of Adelaide, in a paper read before the Tenth Australasian Medical Congress. Clubbe, of Sydney, and other Australian physicians spoke of it as "the pink disease," a term which Dr. Zahorsky urges should be used until the pathology of the condition is better understood. The most extensive report of the disease was made in 1921 by A. J. Wood, of Melbourne, who, in a paper which received notice in THE LANCET,[2] collected records of 91 cases. In the United States the disease has been described by several pædiatrists, including Dr. Zahorsky himself, who at first mistook it for pellagra. In this country the only cases which have hitherto been reported are those by Parkes Weber and Thursfield and Paterson.[3] As a rule an eruption, which may resemble eczema, erythema multiforme, scarlet fever, rubella, urticaria or impetigo, appears to be the first symptom. In other cases the first striking symptom is a change in the child's disposition, which is shown by loss of appetite, insomnia, feverishness, and irritability. The typical rash is not unlike that of miliaria, consisting of minute papules surrounded by a narrow areola. It occurs profusely on the trunk and is less marked on the extremities. Erythematous patches are sometimes seen on the cheeks as well as on the loins, buttocks, thighs, arms, and neck. The miliaria may be associated with a marked redness of the whole integument and so be readily mistaken for the punctate rash of scarlet fever. An intolerable itching of the skin is generally present, and has led to the diagnosis of scabies. Excessive perspiration is the rule. The changes in the hands and feet which gave rise to the appellation used by Snowball of "raw beef hands and feet" form a characteristic feature of the disease. The palmar and dorsal surfaces are bluish red and swollen, and in severe cases icy cold to the touch. Some desquamation is often present. In addition to obstinate anorexia, disturbance of the alimentary system is shown by congestion of the alveolar and buccal mucous membrane, softening of the gums and loosening of the teeth, occasional vomiting, and diarrhœa. The patients appear to be very susceptible to respiratory infections. Three of Dr. Zahorsky's cases developed typical lobar pneumonia. Apart from the psychical changes already mentioned, affection of the nervous system is shown by paræsthesia, which is present in most of the cases, hyperæsthesia, and an initial increase followed by abolition of the deep reflexes. In all severe cases a hyperleucocytosis (from 12,000 to 30,000) is the rule; the differential count varies considerably in different cases. Polycythæmia has been recorded in some cases, including two of those seen by Dr. Zahorsky, who also found an increase in the viscosity of the blood at the height of the disease.

[1] Journal of the American Medical Association, Dec. 9th, 1922.
[2] THE LANCET, April 23rd, 1921, p. 811.
[3] British Journal of Children's Diseases, January to March, 1922.

VACCINAL IMMUNITY.

THE intricate mechanism of immunity is of particular interest in the case of variola and vaccinia. A lecture recently given by Dr. H. A. Gins at the Robert Koch Institute in Berlin, summarised on p. 99, sets out some of the points which are specially interesting German workers. With several of these we are already familiar—e.g., it is well known that the higher the immunity the more insignificant and circumscribed is the local vaccination reaction, and conversely, a lower immunity coincides with a more severe local and general reaction. The quality of the local revaccination is an index of the degree of immunity possessed by the individual. The practical deduction is that vaccination or revaccination during an epidemic will readily distinguish those individuals who are likely to develop small-pox; contacts of small-pox patients who have been revaccinated, and who are showing a definite reaction that they are not immune, are those who must be carefully watched for signs of developing small-pox. It is also well known that if an individual is vaccinated or revaccinated in the incubation period of the disease, he will either be prevented from showing symptoms of small-pox or will develop the disease in a mild form, according as to whether the operation was performed early or late in the incubation period. If carried out during the first few days he will probably show no evidences of the disease; if later, various degrees of severity of small-pox may appear, the accepted explanation being that the attenuated, quickly growing germs of vaccinia produce immunity earlier than the virulent, more slowly growing organisms of small-pox. It is a race in the blood between the two types of organism. Whether the epidermis plays so important a part in the production of small-pox immunity as Dr. Gins contends must be the subject of further investigation: it can hardly be accepted on the evidence submitted, and so far the results have not reached a stage of any great practical value. The shifting of the age-incidence of small-pox in an immunised population is well brought out in the Berlin figures shown in Table II. Similar figures were worked out for this country many years ago, indicating that small-pox from being a disease of children has now become a disease of adults. The figures of the recent Glasgow epidemic indicate that neglect of infant vaccination is causing the pendulum to swing slightly back again in the old direction, and children are now becoming

more liable to attack and death. The discussion which followed on the delivery of Dr. Gins's paper revealed a number of practical questions on which opinion is still divided, but the tendency still further to increase the potency of the vaccine was condemned on the ground of the danger of severe reaction, and the consequent risk of bringing the operation of vaccination into disrepute.

DEATH CERTIFICATION WITHOUT INSPECTION.

Dr. W. H. Whitehouse, coroner for Greenwich, recently held an inquest upon the body of a man in whose case a certificate of the cause of death had been given by a medical man who had not seen the body. Commenting upon the law which permits this course, the coroner said: "It is a remarkable thing that a medical practitioner may be called upon at any time, without seeing the body, to say that death was due to an observed disease, when violence or some other cause may have been responsible." He added that certainly the law governing death registration should be altered. Whenever, and if ever, the Act relating to coroners, which was passed in 1887, is amended or a new Act substituted for it, provision will no doubt be made for the medical man who certifies the cause of death only doing so after ascertaining by examination that death has taken place apparently from the causes which he certifies, and for which he has attended the deceased. It was so recommended by the departmental committee which reported fully in 1910 upon the law relating to coroners. Presumably, now that any change in the law will have to be made more than 12 years after the committee's report, a fresh committee will have to reconsider the findings of its predecessors, and will, perhaps, make fresh recommendations in view of later experience. The experiment, for example, of coroners sitting without juries has now been given a full trial in recent years, and no common or authoritative opinion on the subject has been elicited.

CALMETTE ON PASTEUR.

A SPECIAL number of the *Bulletin* of the French Academy of Medicine reports the séance of Dec. 26th, 1922, which was given up to a celebration of the hundredth anniversary of the birth of Pasteur. Mr. A. Béhal, the President, opened with a biographical sketch, which was followed by estimates of Pasteur's work in relation to general biology, medicine, surgery, obstetrics, and veterinary medicine. Finally, Prof. A. Calmette, sub-director of the Institute, epitomised Pasteur's work in relation to the progress of hygiene. Without going further back than a bare half-century, it was possible, he said, to find the standard text-book of hygiene filled with such vague conceptions as temperaments, idiosyncrasies, habitudes and morbid *imminences*, and the frequent use of such terms as circumfusa, ingesta, excreta, applicata, percepta, and gesta. In the sixth edition of Michel-Lévy's authoritative handbook, published in 1879, no mention whatever appears of *maladies contagieuses*, nor of sanitary measures for avoiding them. At this epoch the magic of words still sufficed to satisfy the hygienic curiosity of the greater number of the medical profession. Prof. Calmette compared the mortality from transmissible diseases then and now, taking rabies and puerperal fever as examples. Before 1886 official statistics showed that for 100 persons bitten by rabid animals about 47 died of rabies, the mortality rising to 80 per cent. for those who had been bitten on the face. Now, from 1886 up to Jan. 1st, 1922, in the Pasteur Institute of Paris alone, out of 44,817 persons treated by Pasteur's method for prevention of rabies the total number of deaths was 150, or only 3 per thousand. In Berlin in 1864 puerperal fever carried off one mother in every 36 confinements; in London, from 1833 to 1865, the proportion was one to 34; in France, Tarnier reported in 1856 a childbirth mortality of one to 19, almost 6 per cent. "I saw," said Tarnier, "women enter the hospital in good health, full of life, and 24 or 48 hours later I was present at their death agony. It was a terrible spectacle!" Mortality in childbirth at this epoch was 17 times greater in hospitals than at home. Prof. Calmette recalled in this connexion the memorable séance of the Academy in 1879, when Hervieux was attempting to prove that puerperal fever at all events did not come within the germ theory, and Pasteur cried out, "Will the Academy permit me to sketch under its eyes the dangerous microbe to which I have been brought to attribute the existence of this fever." Now, as a result of antisepsis in maternity practice, the mortality at the Lariboisière fell to 0·39 per cent. by 1889, and at the Baudelocque Clinic, with the use of asepsis, sterilised gloves, and antistreptococcic serum, it had fallen below 0·05 per cent. Prof. Calmette concluded with a brief résumé of the effect of Pasteur's work on public hygiene. All that it is still customary to include under this word has been completely transformed by Pasteur's discoveries which introduced the idea of contagion. This idea was publicly announced for the first time in the British Public Health Act of 1875; it did not make its way officially into French sanitary law until Feb. 15th, 1902. "We can only regret," he said, "that Pasteur's own country was not the first to profit by the beneficent consequences of his work."

THE CENTENARY OF THE MEDICAL SOCIETY OF BRUSSELS.

THE hundredth anniversary of the Société Royale des Sciences Médicales et Naturelles de Bruxelles was celebrated at a special meeting held on June 22nd, 1922, and the happy occasion has been further marked by the issue of a handsome "Volume Jubilaire." From an interesting account of the history of the society we learn that the first association of the kind in Brussels was the Société de Médecine, de Chirurgie et de Pharmacie, founded in 1795 when the revolution was in full swing. Internal dissensions led to the evaporation of this organisation, which was in 1804 replaced by the Société de Médecine de Bruxelles which did useful work until it, too, disappeared in the political turmoil of 1814–15. And it was not for several years that the Belgians could find leisure in their attempts to live peaceably in the United Kingdom of the Netherlands to replace it. Ultimately, however, on July 13th, 1822, the present society began its official existence which has done so much to promote the objects for which it stands. A glance through the summary history of its activities and the 54 papers which form the greater part of this jubilee volume emphasises the catholic breadth of its interests. Predominantly medical, the other natural sciences are always well represented. The first five papers, for example, deal with the anatomy of the pancreas in diabetes, multiple monstrous embryos in mollusca, the psycho-physiology of the fœtus and new-born infant, the action of quinidine in auricular fibrillation, creatine and creatinine in the blood. The members of the society evidently realise, as other medical men have done, that they will probably get the best progress if they cast their net widely and pick up from any and every department of natural knowledge pieces of information which are illuminating in their more professional applications. On such broad grounds the society has achieved great success; we wish it all good fortune in its continuance for another hundred years.

WE regret to announce the death of Dr. Alfred Maxwell Williamson, medical officer of health for the city of Edinburgh.

THE Hunterian Oration of the Royal College of Surgeons of England will be delivered by Sir John Bland-Sutton in the theatre of the College on Wednesday, Feb. 14th, at 4 P.M.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

II.

THE TREATMENT OF EARLY PULMONARY TUBERCULOSIS IN THE YOUNG ADULT.

THIS problem may, perhaps, be best approached by discussing a concrete case characteristic of thousands. A young man of the lower middle-class has hitherto been well and has just made a promising start in life, when he begins to lose weight and show other signs of failing health. Tubercle bacilli are found in his sputum. What should he be advised to do? All will often depend on the character of the advice given at this most critical stage in his career. He may follow one of three courses: 1. Go away for a change and live "the simple life" for some months in the country. 2. Go to a sanatorium. 3. Undergo treatment at home.

1. *The Simple Life.*—The risks of this course are enormous. Just at a time when the patient most needs skilled daily supervision he is deprived of even the limited curb of home life. He meets only able-bodied persons and is expected to live their life. Having nothing better to do, and knowing no better, he may go for long country walks, tragically ignorant of the harm of exercise unregulated by the clinical thermometer. He may, perchance, return home much better, *but he has not learnt his lesson.* So when he again breaks down, he is no wiser or better off than before.

2. *Sanatorium Treatment.*—The advantages of going at once to a sanatorium are innumerable. Many sanatoriums are not perfect, and quite unnecessary hardships are sometimes inflicted. But this is certain: the patient who has just developed pulmonary tuberculosis must completely revolutionise his life if he wants it to be long. He must be born again. Only in a well-conducted sanatorium is his re-birth feasible. He has to learn how to regulate every hour of his day, what to do and, above all, what not to do. In the sanatorium he learns from second- and third-stage patients how they came to this pass. Re-admission patients tell him the story of their relapse—how it might have been avoided. All this and much more he learns at the sanatorium. To expect him to acquire this knowledge from books and casual chats with his medical attendant is to expect the impossible. Never tell the patient that he will be cured by three months' sanatorium treatment. At the Mt. McGregor Sanatorium [1] (U.S.A.) for wage-earners, it was found that from one to seven years after discharge 90 per cent. of the patients in the incipient stage were fit for work. The average duration of treatment for patients in this stage was *seven* months. At Saugman's sanatorium [2] (Denmark), where patients stay as long as they wish, or as their means allow, over 90 per cent. of the first-stage patients were found to be fit for work three years after discharge. These successes were achieved because the two sanatoriums concerned were not handicapped by the "cure-in-three-months" fallacy.

3. *Home Treatment.*—Sometimes there is no alternative but treatment at home. The first essential to success is control of the temperature. Take it in the rectum. To order the patient's life and to graduate his exercise by the mouth temperature is often to court disaster. A rectal temperature of 98·2° F. or more on waking in the morning, or of 99·5° or more between 5 and 6 P.M. after an hour's rest in the horizontal position is abnormal and contra-indicates all exercise. Such a temperature points, as a rule, to complete rest in bed. See Dr. S. Vere Pearson on the temperature in phthisis.[3]

The Doctrine of Graduated Exercise.—The doctrine of graduated exercise owes its popularity to: (1) the vigorous and charming personality of its chief sponsor; (2) the primitive instincts of a race whose strength has never been to sit still; and (3) a minute kernel of truth. When the temperature is normal throughout the 24 hours, *carefully* graduated exercise is beneficial. But it is most difficult to graduate exercise and almost impossible to graduate the resultant auto-inoculation. It is probable that the doctrine of graduated exercise has done more harm than any so-called remedy—even more harm than tuberculin. The mortality is far greater from pulmonary than from surgical tuberculosis because auto-inoculation is far greater and more uncontrollable in the former. Yet, consumptives are set navvies' work, while the subjects of surgical tuberculosis are immobilised! The successes achieved by the silence treatment of tuberculosis of the larynx and by artificial pneumothorax and thoraco-plastic operations have done much to prove that immobilisation is quite as essential to the tuberculous lung as to the tuberculous joint. Ungraduated rest, rather than graduated exercise, is the patient's first need when his disease is incipient and active.

Diet.—Do not stuff the patient. If mind and body are at rest, and there is little or no fever, he will eat all that is necessary, and if he is exhausted and feverish, forcing food on him will do little good. Milk in moderation is good, but at best it is a sloppy food to which many patients naturally object. Cod-liver oil is a useful supplement to food, especially in the winter; its vitamin content is approximately 200 times that of fresh butter. If the patient objects to the taste of cod-liver oil, give it in capsules, and remember that small doses over a long period are more beneficial than large doses, against which the system revolts after a week or two.

Specific Treatment.

Two enormous works, one in French,[4] the other in German,[5] have recently been published on specific treatment. They are a record of failures and deadlocks. Some day, no doubt, a master-mind will disentangle this twisted skein of research and give us a clear therapeutic lead. But at present we are far more embarrassed than benefited by the prodigious output of new vaccines, serums, and chemo-therapeutic remedies. Some are harmful, others harmless, apart from their exorbitant cost. None is of any proven specific value. But the few specific remedies which are harmless and not too costly, and which are administered by injection, do possess two very real merits. They act by suggestion and enable the physician to keep in constant touch with, and control of, the patient, who would otherwise drift away, neglecting the measures which, though of prime importance, he is apt to imagine are merely supplementary to the injections. A useful treatment of this kind is that

[1] American Review of Tuberculosis, October, 1922.
[2] Meddelelser fra Vejlefjord Sanatorium. By C. Saugman. Copenhagen: G. C. E. Gad. 1920.
[3] The Temperature as a Guide to the Treatment and Prognosis of Phthisis, THE LANCET, Sept. 18th, 1909.
[4] L'Infection bacillaire et la tuberculose chez l'homme et chez les animaux. By A. Calmette. Second edition. 1922. Paris: Masson et Cie. Pp. 644. Fr.50.
[5] Lehrbuch der Spezifischen Diagnostik und Therapie der Tuberkulose. By Dr. Bandelier and Prof. Roepke. 1922. Leipzig: Curt Kabitzsch. Pp. 631.

recently advocated by Dr. E. E. Prest.[6] Possibly it may have other virtues than the two just mentioned.

Cough.—If all coughing could be prevented, pulmonary tuberculosis would cease to be the fatal disease it often is. The text-books contain dozens of prescriptions for cough-mixtures, but often omit the most important point that many, if not most, coughs can be aborted by an effort of will. Coughing is like drink: the more you indulge in it, the more you want. The unrepeated cough is rare. Teach the patient that every cough is a nail in his coffin. Once, during a concert given at a sanatorium, the only members of the large audience who coughed incessantly were two non-tuberculous persons. The third-stage patient who has learnt to control his cough is often in the position to attend the obsequies of the ex-first-stage patient who barks incessantly.

Night-sweats.—They are rare in a sanatorium, and reflect adversely, as a rule, on the physician's management of a case. They are due to excessive auto-inoculation by day, or to inadequate ventilation and too warm clothing at night. Both causes can be eliminated. There are scores of prescriptions for night-sweats. Doubtless atropine and other drugs may suppress or reduce them. But the sweats are a salutary warning, and merely to suppress them with drugs is like boxing the ears of the small boy who truthfully cries that your house is on fire.

Hæmoptysis.—Shun opium and its derivatives, which, though useful in pleurisy, are mischievous in hæmoptysis. Not one hæmoptysis in a hundred is directly fatal from the mechanical effects of loss of blood. But many a hæmoptysis is the starting-point of a serious and rapid extension of the disease due to stagnation of effused blood in the lungs. Such stagnation is greatly facilitated by opium, the conventional ice-bag, and by keeping the patient absolutely quiet in bed. Keep him in bed certainly, but let him sit up and change his position whenever he likes. The recent work of S. Bang[7] has shown that hæmoptysis is remarkably independent of the patient's movements. The most effective hæmostatic has been shown by the investigations of H. Elving[8] to be calcium chloride, 20 c.cm. of a 15 per cent. solution injected into a vein rapidly increasing the rate of coagulation of the blood. A more simple procedure is to give 5 to 15 g. of sodium chloride by the mouth; as von den Velden[9] has shown, sodium chloride thus given increases the rate of coagulation in five minutes. When the patient is very nervous 3 g. of sodium bromide may be substituted for the sodium chloride; remind the patient that "bleeders do best."

Miscellaneous Hints.

Teach the patient to go to bed whenever he catches a cold, and to remain there till it is over. It may then last only a few days. Otherwise it may last for months, stirring into renewed activity lesions which had "healed." The non-tuberculous person can, unfortunately, afford to go about with a cold, coughing, sneezing, and spluttering. The consumptive cannot. Encourage him to take a whole or half day off in bed every Sunday and always to rest for 30 to 60 minutes before each meal. Never send him to a consultant who has recently identified himself with some new cure-you-while-you-wait "stunt." There is at present no short cut to recovery. For an excellent account of home hydrotherapy consult Sir James Kingston Fowler's "Pulmonary Tuberculosis" (pp. 202 and 203), and for the general management of the case Dr. F. Rufenacht Walters's "Domiciliary Treatment of Tuberculosis." Good books for the patient to read are Dr. Lawrason Brown's "Rules for Recovery from Tuberculosis," and Dr. Noel D. Bardswell's "Advice to Consumptives."

CLAUDE LILLINGSTON, M.D. Camb.

[6] The Treatment of Tuberculosis with Colloid of Calcium, Brit. Med. Jour., Jan. 14th, 1922.
[7] Tubercle, October, 1919.
[8] Finska Läkaresällskapets Handlingar, November to December, 1921.
[9] Ztschr. f. Exper. Pathol. u. Therapie, 1910, Nr. 7, p. 290.

Special Articles.

COÖRDINATION OF HEALTH WORK IN AMERICA.

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Antecedents and Membership of the National Health Council.

THE history of the National Health Council stretches back over a period of 12 or 15 years, during which the need for coöperation and coördination among national health agencies was seen more and more clearly throughout the United States. Especially important was a conference of 39 health agencies held in April, 1913, at New York, at the suggestion of the Council on Health and Public Instruction of the American Medical Association; this conference resulted in the appointment of Prof. Selskar M. Gunn to study the problems of coördination among national health agencies. His report, completed in May, 1915, showed that 24 national organisations, of which 10 were of greater importance, were engaged in health activities. A continuation committee took up the intensive study of these organisations for the purpose of developing a national clearing-house for voluntary health work, but these developments were interrupted temporarily by the war, and were only taken up again in the winter of 1918–19, when a conference was called by the American Public Health Association. Further study was then found to be necessary, and in the summer of 1920 a special committee was formed for this purpose, and Dr. Donald B. Armstrong was engaged to make a survey of the existing situation, the work being financed by the American Red Cross. His report was presented to a conference which met in Washington in October, 1920. After discussion of the report by this and a subsequent conference the National Health Council was at last formally organised in December, 1920.

The 14 organisations which are direct, indirect, or conference members of the National Health Council cover the major fields of public health work in America. The general American public is perhaps best represented by the American Red Cross, the professional health worker by the American Public Health Association and the Conference of State and Provincial Health Authorities of North America, the medical profession by the Council on Health and Public Instruction of the A.M.A., the public health nurse by the National Organisation for Public Health Nursing, and the National Government by the United States Public Health Service, which is a "conference member" of the Council. The National Child Health Council represents a group of child welfare organisations, and the National Committee for Mental Hygiene, the American Social Hygiene Association, the National Tuberculosis Association, and the American Society for the Control of Cancer are also members of the National Health Council. The financial support of the Council has been derived from several sources, but especially from the American Red Cross and certain foundations. Dues of members, payments for services rendered by the Council to members, and the sale of publications issued by the Council are further sources of revenue.

Purposes and Organisation.

The Council exists to promote mutual understanding and helpfulness among American health agencies and to aid them in their work by conducting a central service bureau. The fundamental spirit of the Council is exemplified, and its practical operation is made more feasible, by the close association of members in a joint office arrangement. Seven of the associations and committees, coöperating through the common service committee of the Council, have established joint offices in the Penn Terminal Building in New York. By this arrangement the directors and staff

of the several agencies having headquarters in New York are in daily contact with each other. This close association is increased by the organisation under the Council's business committee of inter-staff conference groups appointed to advise members on their activities, under the following heads: nursing coördination, publicity and education, publications, and health plays, exhibits, and films. There are also standing committees to promote efficiency in the service and to safeguard the health and welfare of employees. Two special committees on "health days" have been appointed to prepare plans for a national campaign in which health examinations will be emphasised. The secretariat of the Council coördinates and, so far as possible, gives effect to the work of these inter-staff committees. The Council itself, as distinguished from the groups of staff members, is composed of one representative and one "alternate" from each member agency. This small group of official delegates govern the Council and determine all matters of policy, but the Council has delegated authority for the execution of policy to a group of five representatives called the business committee, to a committee on membership, and to a common service committee. The organisation of the Council is kept as simple as possible, and its secretariat is maintained on inexpensive and modest lines.

Achievements of the Council.

The functions of the Council are best indicated by a brief summary of its current activities and achievements since the foundation. The work is carried on in two offices—viz., the official headquarters in Washington and the joint offices in New York. Through the Washington office, for which a room is generously provided by the American Red Cross, the Council's representative has been in close contact with those government bureaux which deal in any way with health, and with the American Red Cross and the National Child Health Council. At the New York office are carried on those services which require association with the largest number of national voluntary health and welfare agencies. The following is a brief résumé of the work of the Council in both offices.

1. *Publications.*—(*a*) Establishment and maintenance of the federal health legislative information service, including a bulletin; (*b*) maintenance of the State health legislative information service in coöperation with the United States Public Health Service, also including a bulletin; (*c*) issue of the "Monthly Digest," a general information publication; (*d*) issue of the "Library Index," listing important current health publications; (*e*) issue of list of 300 health films; (*f*) issue of the "Weekly Common Service News," a "house organ" for the staffs of members.

2. *Special Washington Activities.*—(*a*) Publication of a series of authoritative reports and an organisation chart dealing with the health activities of various government bureaux; (*b*) coöperation in development of plans now being carried out for a permanent health exhibition at the Smithsonian Institute in Washington; (*c*) general headquarters service for members (personal representation, arrangement of conferences, collection of information, &c.); (*d*) consultative assistance for the American Red Cross health service.

3. *Common Service Committee Activities.*—(*a*) Joint office projects for certain member and tenant organisations, including renting, leasing, janitor service, &c.; (*b*) accounting, library, purchasing, mimeographing and copying, shipping, storage, telephone exchange, film distribution, &c.; (*c*) direction of work of inter-staff conference groups; (*d*) establishment of a health examination system for staffs of members; (*e*) confidential study of salary standards and methods among organisations in New York joint offices; (*f*) office administrative studies.

4. *Additional Information Service.*—General clearing-house of information regarding health organisations and health work, &c.

5. *National Coördination Work.*—Arrangement of lectures for staffs of members and for outside agencies, study of health plays, assembling of exhibition materials, and arrangement of exhibitions, inquiry into problems of production and distribution of health motion pictures, &c., and establishment of a statistical service, and of various committees to consider problems of public health nursing, negro health interests, national health days, &c.

6. *Field and State Coördination Work.*—Preparation of special reports on public health subjects for various associations, and study of coördination of health activities in several States.

7. *Miscellaneous Services.*—(*a*) Organisation of health institute in connexion with semi-centennial of the American Public Health Association; (*b*) coöperation in Rotary Health Week with members, particularly with the National Tuberculosis Association; (*c*) coöperation in Cancer Week activities, 1921 and 1922; (*d*) numerous minor activities.

Programme for 1923.

The programme for the year 1923 involves, in the main, a continuation of activities already under way, together with attention to their improvement. It will be understood that, during the experimental years of the National Health Council, all activities are subject to constant critical study. Those which prove to be useful to members and to their enterprises may be elaborated, the resources of the Council permitting. Others will be discontinued and new services will be established as rapidly as clearly-defined needs appear.

THE RAINFALL OF 1921 AND 1922.[1]

TOWARDS the close of 1922 the Meteorological Office (Air Ministry) issued their report on British rainfall for 1921. No one who has studied the report will regret or wonder at its somewhat belated appearance; it contains a mine of clearly stated information about the most remarkable meteorological year on record. It is probably to this fact, rather than to the mere data of total rainfall, that we must look in considering the economic effects of a dry period like that of 1921. The great bulk of the water used for domestic and industrial purposes in the south-east of England has percolated into the porous rocks many months before it is utilised, and the effects of so disastrous a drought must, therefore, inevitably continue long after its termination, since subsequent heavy rains must be required to help to restore the subsoil water level. These facts are worthy of the earnest consideration of water authorities.

Rainfall, 1921.

The deficiency of rainfall in the south-east of England was so great that the replenishment of underground sources of water was practically entirely suspended. The report states that as regards evaporation, taking, as an example, Camden-square, London, where observations have been continued since 1885, the remarkable figure of 19·69 instead of an average (1885–1919) of 15·5 (+4·19) in. is recorded. Thus the amount of evaporation exceeded the average by 4·19 in. and was for the first time on record actually larger than the total rainfall. It is true that in 1906 and 1911 somewhat comparable figures (19·03 and 19·53 respectively) were obtained, but these were phenomenally warm years of about average rainfall. It is somewhat doubtful whether records of observations of percolation and evaporation represent the actual facts with the same precision as those of rainfall, but they can be accepted as giving some evidence of the conditions which prevailed. During 1921 there were areas in Essex, Kent, and the Fen District where the number of rain days (0·01 in. or more of rain per day) was actually less than 100; the ordinary qualifications (such as "weather permitting") almost ceased to be used over a large portion of the British Isles, and open-air engagements were generally made

[1] Previous articles and comments on the drought appeared in THE LANCET, 1921, ii., 353, 668, 671, 1234; 1922, i., 145, 148, 448, 1203, ii., 88.

without any reference to such contingencies as rainfall. The deficiency in rain days for the whole of the British Isles was not nearly so remarkable, but this was due to contributions from areas outside the south-east of England where normal, or less abnormal, conditions prevailed. The distribution of wet days (0·04 in. or more of rain per day) was somewhat similar to that of rain days and to total deficiency of rainfall; the south-east of England had less than 75 wet days, and for the whole of England and Wales the number was only 110, as compared with 151 in 1920 and 143 in 1919. On the average, 64 absolute droughts (15 or more consecutive absolute non-rain days) and 52 partial droughts (29 or more consecutive non-rain days, not absolute but judged by mean rainfall) occur annually at 100 recording stations. In 1921 the figures were 86 and 109, indicating that there were more long *rather* dry periods than short *very* dry periods. As regards dry spells (15 or more consecutive non-wet days) at 100 stations the figures for 1919, 1920, and 1921 were 98, 56, and 201 respectively. The definitions given, useful as they are, do not reveal the main characteristic of 1921, which was the persistence of deficient rainfall to a degree hitherto unsurpassed. The dates of droughts in 1921 at Camden-square and Tenterden are shown in Table I.

TABLE I.—*Droughts in 1921.*

A = Camden-square, London. B = Tenterden (View Tower), Kent.

—	Absolute droughts.			Partial droughts.			
	Began.	Ended.	Lasted (days).	Began.	Ended.	Lasted (days).	Rain (in.).
A	June 27	July 25	29	Jan. 19	Feb. 28	41	0·40
				June 4	Aug. 11	69	0·54
				Sept. 14	Oct. 18	35	0·31
B	,, 1	,, 5	35	May 8	Aug. 4	89	0·87
	July 7	,, 22	16	Sept. 12	Nov. 1	51	0·51
	Sept. 19	Oct. 9	21				

The number of rain spells (15 or more consecutive rain days) and wet spells (15 or more consecutive wet days) was above the average for the British Isles, but this apparently paradoxical result was largely due to the excessive rainfall in the wettest portions of Scotland. In England the rain and wet spells were abnormally small in number. At Camden-square the total duration of rainfall was only 269·2 hours, or 167·7 below the average of 436·9 (1881–1915). Only once previously (1898) has the number of hours fallen so low as 300.

In some respects the most interesting of these occurrences was that affecting the area of drought. On Sept. 11th, a strip of the south of England, extending from the Thames estuary to the Bristol Channel, received welcome relief from the prolonged and serious drought. The general rainfall over an area of 12,210 square miles was 1·42 in. In England and Wales, as a whole, only two months, January and August, exceeded their averages, and during the remaining ten months the deficiencies rose, in February and June, to 85 and 82 per cent. respectively. The monthly figures for Camden-square read in sequence, as follows: 2·48, 0·19, 1·19, 1·29, 1·03, 0·37, 0·13, 1·65 2·50, 0·63, 2·01, 1·13 in., total 14·60 in. (average 1881–1915, 24·47 in.).

Total Rainfall, 1921, in Relation to the Average.—Over 50 years of complete study, and about 100 years of less comprehensive study, of the distribution of annual rainfall over the British Isles justified meteorologists in drawing certain conclusions. One was that, whatever the rainfall for a particular place might be, it was fairly safe to assume that there the rainfall would not fall appreciably below 60 per cent. of its average in the driest of years. Over a very large area in the south-east of England this limit of 60 per cent. of the average (or 40 per cent. deficiency) was in 1921 exceeded; in these districts the rainfall was probably the smallest for at least a century and a half. In parts of Kent the year's rainfall was less than half the average amount. At Margate only 9·29 in. fell during the year. Over the greater portion of England 10–20 in. of rainfall sums up the position. On the west coast of Scotland a very different set of conditions prevailed, and at Kinlochquoich and Loan (Inverness-shire) the remarkable totals of 148·36 and 201·78 in. were recorded.

Pressure Conditions.—The rainfall of the British Isles is derived almost entirely from the south-westerly variable winds which blow across this country and carry with them large quantities of moisture from the Atlantic Ocean. The normal pressure distribution is represented by practically parallel isobars with a gradient from S.S.E. to N.N.W. The isobars over the north were fairly normal during 1921, but the pressure was decidedly high; towards the south the isobar of 1020 millibars followed the normal direction as far as the south of Ireland and then turned sharply to the S.S.W. This apparently caused a "fanning-out" of the prevailing winds over the south-east of the country. Divergent currents induce, according to expert meteorologists, a tendency to downward motion in the atmosphere, and descending currents give rise to dry conditions. Broadly, the drought was due to the abnormal displacement northward of the high pressure belt.

TABLE II.—*Rainfall (inches) Camden-square, London.*

—	Average (1881–1915).		1921. + = gain. − = loss.				1922. + = gain. − = loss.				Deficiency or gain in 1922, starting with a loss of 9·87 pertaining to 1921.
	Actual figures.	As sum totals, month after month.	Actual figures.	As sum totals, month after month.	Deficiency or gain each month.	Deficiency or gain expressed as sum totals.	Actual figures.	As sum totals, month after month.	Deficiency or gain each month.	Deficiency or gain expressed as sum totals.	
January ..	1·86	1·86	+2·48	+ 2·48	+0·62	+0·62	+2·81	+ 2·81	+0·95	+0·95	−8·92
February ..	1·67	3·53	−0·19	− 2·67	−1·48	−0·86	+2·20	+ 5·01	+0·53	+1·48	−8·39
March ..	1·83	5·36	−1·19	− 3·86	−0·64	−1·50	−1·51	+ 6·52	−0·32	+1·16	−8·71
April ..	1·54	6·90	−1·29	= 5·15	−0·25	−1·75	+3·02	+ 9·54	+1·48	+2·64	−7·23
May	1·76	8·66	−1·03	− 6·18	−0·73	−2·48	−0·83	+10·37	−0·93	+1·71	−8·16
June	2·02	10·68	−0·37	− 6·55	−1·65	−4·13	−1·12	+11·49	−0·90	+0·81	−9·06
July	2·38	13·06	−0·13	− 6·68	−2·25	−6·38	+3·85	+15·34	+1·47	+2·28	−7·59
August ..	2·21	15·27	−1·65	− 8·33	−0·56	−6·94	+2·54	+17·88	+0·33	+2·61	−7·26
September..	1·82	17·09	+2·50	−10·83	+0·68	−6·26	+2·13	+20·01	+0·31	+2·92	−6·95
October ..	2·63	19·72	−0·63	−11·46	−2·00	−8·26	−1·02	+21·03	−1·61	+1·31	−8·56
November..	2·36	22·08	−2·01	−13·47	−0·35	−8·61	−1·43	+22·46	−0·93	+0·38	−9·49
December ..	2·39	*24·47*	−1·13	*−14·60*	−1·26	*−9·87*	+3·14	*+25·60*	+0·75	*+1·13*	*−8·74*

Other Features of the Drought.—The report states that in the south of England records of rainfall duration were in nearly every case the lowest ever recorded; the percentage deficiency of duration was approximately the same as that of the total fall, and the percentage deficiency of days with rain was of about the same magnitude as that of the total rainfall. These observations suggest that the drought of 1921 may be regarded as the result of rainfall being extremely infrequent, such rain as did fall being of about normal intensity. A large number of observers comment on the infrequency of thunderstorms, and it may be added that although a fair number of

cyclonic rains occurred, cyclonic rains were certainly scarcer than usual and very few of them were of notable intensity.

Rainfall, 1922.

In considering the rainfall in 1922 (see Table II.) the drought of 1921 must be borne in mind; a year may stand for itself, to some extent, so far as surface waters are concerned; but with regard to underground water the case is very different. The wet years preceding 1921 were probably, in their cumulative effect, a reserve force of considerable power. The year 1922 opened very well, the gain at the end of February being 1·48 in., reduced in March to 1·16 in., rising in April to 2·64 in. May and June were disappointing, the gain falling to 0·81 in., but at the end of September the gain was 2·92 in. Nevertheless, it must always be remembered that the rainfall in late spring, in summer, and in early autumn is largely discounted by evaporation, luxuriant growth of vegetation, &c. October and November were most disappointing. These, with the months of December, January, and February have a dominating influence on water-supply. By the end of November the gain of 2·92 in. in September had fallen to the meagre figure of 0·38 in. Approximately, the first two-thirds of December fell far short of expectations, but the Christmas season was so far satisfactory that the rainfall for the year 1922 (25·60 in.) exceeded the average by 1·13 in., and January, 1923, starts under favourable auspices.

Combined Rainfall, 1921–22.

The position for the 24 months ended Dec. 31st, 1922, is not altogether satisfactory. For the period in question the deficiency (Camden-square) amounts to 8·74 in., and as our hopes were previously based on 1922, so must we now look to 1923 for a restoration of the balance. In 1922 there was a pretty general feeling that the wet summer had more than compensated for the drought of 1921, but this view will not withstand the acid test of expert experience. In effect, the drought of 1921 still persists, hardly mellowed by the experiences of 1922, and almost entirely dependent on 1923 for a restoration of the normal balance. The position is not disquieting, but it affords no grounds for jubilation from a waterworks, or perhaps from any other point of view.

VACCINAL IMMUNITY:
RECENT GERMAN WORK.

IN a lecture recently given at the Robert Koch Institute for Infectious Diseases in Berlin, Dr. H. A. Gins[1] sketched the gradual growth of our knowledge of a subject which is even now but very imperfectly understood. It has been known for a long time that a true small-pox epidemic occurs only in man and in sheep, the disease in cattle, goats, and pigs giving rise only to a localised process, the virus from which is not particularly infective. The experiments of the earliest vaccinators, Jenner, the Italian Sacco—who was the first to discover the principle of allergic reaction—Pearson, and others established the fact that an attack of either kind of small-pox is capable of giving protection against its own or any other variety, and, further, that an animal-pox is probably in close biological and ætiological relationship with small-pox epidemics in man—hence the practically simultaneous disappearance of ovinia (sheep-pox) and small-pox from Germany.

Nature of the Protective Substances.

The practical result of these discoveries is to be seen in Jugo-Slavia at the present time, where the protective inoculation of sheep has been successfully practised with highly virulent non-glycerinated vaccine on principles laid down by the speaker. The French authors, Bridré and Donatien, who were unsuccessful in similar experiments, worked with a different technique and with a much less virulent vaccine. The discovery of specific changes in the blood serum in epidemic diseases, which was contemporaneous with the evolution of bacteriology, led to the search for specific substances in the blood both of small-pox patients and of experimental animals, but although the resulting researches led to a variety of interesting results they have hitherto not yielded any points in the serological differential diagnosis between small-pox and varicella. Precipitin was first discovered by Tanaka in 1903, but in spite of the confirmation of his discovery by several writers it has led to no important results, the same being true of Sato's new test with the serum of vaccinated rabbits. Complement-fixation substances in small-pox and vaccinia have been exhaustively studied by several writers, but hitherto have for various reasons been found of little practical value. Of greater importance are the anti-virulent substances in the blood in small-pox and vaccinia, which were first discovered by Hlava and Honl in 1895, and which since then by means of an improved technique have been found by Gins and by Sato to be constantly present in the serum of vaccinated rabbits. In the serum of convalescents from small-pox both Gastinel and Gins have found the same substances, but not, at least so far as the experience of the latter observer is concerned, with such absolute constancy as to serve as a method of diagnosis. Fujii has also quite recently found these bodies in the blood of vaccinated and revaccinated people.

These results have shown beyond a shadow of doubt that we are here dealing with substances that have a definite value as an expression of immunity, or at least bear some relation to it. Their disappearance from the blood does not necessarily coincide with loss of immunity either in experimental animals or in man, in whom they are frequently lost while an undoubted immunity still persists. They are therefore probably to be looked upon as the sign of a newly-acquired immunity, and as such are of definite clinical value. The great point of Gins's paper is, however, the value he attaches to the function of the epidermis as the most important element in the production of small-pox immunity, in proof of which he adduces the suggestive fact of the non-appearance of the inoculation pustule in immune individuals after cutaneous inoculation of the virus.

The Site of Immunity.

After a general survey of vaccinal immunity in experimental animals, in which he gives grounds for believing that the horny layer of the skin invariably takes some part in the process, Gins points out that the key to the problem lies in the researches of Pirquet and others, who have demonstrated the fact that the convalescent small-pox patient and the vaccinated individual react to revaccination in a different manner from other people; so much so, that we can to-day take for granted that the higher the immunity the more insignificant and circumscribed is the local reaction, and, conversely, the greater the susceptibility the more severe are the local and general reactions. He notes by the way that although absolute immunity is to be met with it is rare, any immunity being as a rule capable of being broken through by exceptionally virulent material. By the trifling degrees of revaccination reaction the virus is shown to be quickly destroyed, and only in cases of the more severe local and general reactions an augmentation [Vermehrung] of virus takes place at the site of inoculation. It is easy to understand that in these latter circumstances a reinforcement of immunity is obtained, owing to the considerable amount of virus in the circulation which is producing antigen. Sato, in recent experiments on immunised rabbits, concluded that in revaccination an increased immunity is attained without any increase of virus at the site of inoculation, but Gins considered his technique to be in fault, and reiterates his conviction that immunity can only be raised where there is such a local increase. On epidemiological grounds Paul and Jürgens came to the same conclusion. In every small-pox epidemic

[1] Med. Klinik, Nov. 19th, 1922.

individuals are found who shortly after a successful vaccination contract varioloid. In every such case in which Dr. Gins had been able to ascertain the nature of the revaccination reaction he found it to have been either papular or vesicular [Knötchen- oder Bläschen-reaktion], and comments on the peculiar property thus attaching to immunity:—Vaccinal immunity is capable of destroying vaccinia virus introduced into the epithelium, but cannot prevent virulent infection with true small-pox virus. The practical bearing of all this Dr. Gins shows to be the fact that from the quality of the local revaccination appearances the degree of immunity present can be ascertained. Revaccination will enable immune individuals to be recognised and will immunise afresh those who are no longer immune.

Immunity and Age-Incidence.

If the kind of reaction be taken into account in revaccination striking differences will be found in the different age-groups, as will be seen in Table I., in which the influence of revaccination on the raising of immunity is unmistakable, as is also the increase of defectively immunised individuals after the age of 36.

TABLE I.

Age-group.	Vaccinations.	Fully developed pustular reaction.	Percentage giving pustular reaction.
12th year.	1435	321	22·3
12th–20th year.	794	108	13·6
21st–25th ,,	818	155	18·9
26th–30th ,,	613	139	22·6
31st–35th ,,	465	135	29·03
36th–40th ,,	386	190	49·2
Over 40	1238	768	62·04

Dr. Gins believes that a similar estimation of the proportion of badly protected individuals in the general population has never before been undertaken. He also gives an instructive table (II.) showing the death-rate from small-pox in Berlin in the different age-groups at three different periods.

TABLE II.

—	1758–74	1870–72	1916–17
Percentage of deaths over 40 years .	0·07	25·85	90·56
,, ,, between 39 and 12	1·25	27·13	7·32
,, ,, under 12	98·7	49·02	2·12

The influence of a general immunity will thus be seen to be demonstrated by a complete reversal of the figures. From being a disease of children small-pox has become definitely a disease of adults, this alteration in the character of an infectious illness having been effected purely by a systematic active immunisation.

Dr. Gins made no claim in his paper fully to have cleared up the disputed questions connected with small-pox immunity, but merely to have helped in their solution by pointing out that neither laboratory work, nor statistics, nor epidemiology can separately lead to any conclusive results, a critical utilisation of all these methods of investigation with the same object in view being indispensable.

VITAL STATISTICS OF SCOTLAND, 1921.

THE relatively prompt issue of the Sixty-seventh Annual Report of the Registrar-General for Scotland, dealing with the vital statistics of the year 1921, even though its price is marked as 10*s.* 6*d.*, gives a feeling of satisfaction which contrasts with the feelings beginning to be entertained anent the inordinate delay in the issue of the English Registrar-General's reports. Why is this? But as Kipling has it, that is another story.

The present Scottish report, although not so exhaustive as the English report—the medical comments in which are a mine of invaluable information—contains matter of great interest to physician and statistician alike.

Births.—The birth-rate was 25·2 per 1000, which is slightly lower than the birth-rate in the ante-bellum years. But the death-rate being only 13·6, there is still a rate of natural increase of 11·7 per 1000, which leaves a satisfactory margin for that invasion of other parts of the world by competent and indispensable Scottish leaders in the various calls of life.

Deaths.—The infant death-rate was 90·3 per 1000 births, as compared with 92·0 in the preceding year. A study of the relative infant mortality in different parts of Great Britain and Ireland shows that the course of events for a considerable series of years has run almost parallel in Scotland and in Ireland, but that in the last few years the rate of infant mortality has fallen at a considerably greater rate in Scotland than in Ireland. England's infant death-rate has parted company with its Scottish and Irish neighbours, and has declined to an extent which differentiates England's experience most markedly. Why is this? Meteorological differences are not likely to be competent to account for this difference; and there can be little hesitation in falling back on the wider spread and more successful child welfare work which during the present century has been carried out in England.

Tuberculosis.—A few years ago Prof. Pearson in *Biometrika* suggested the likelihood that the decrease in the rate of decline of the death-rate from phthisis in England might even be followed by a cessation of this decline or an increase in the phthisis death-rate. English experience falsifies this forecast; and the Scottish figures point in the same direction as the English. The Scottish death-rate from phthisis in 1871–80 averaged 244 per 100,000; in 1881–90 it had become 202; in 1891–1900 the rate was 171, in the next decade 139, and in 1911–20 it was 105, reaching the remarkably low figure of 81 in 1921. Table 40, from which the above figures are extracted, does not separate the sexes, and this is unfortunate in view of the disturbing influence of war on sex proportions: but it is remarkable that the Scottish figures for phthisis in both sexes together fail to show the great temporary increase in death-rate which occurred in England. The terrible figures of phthisis mortality in certain areas—e.g., 230 in Lerwick, 217 in Invergordon, although occurring in small populations, call for exhaustive inquiry and remedial measures.

Cancer.—Next to tuberculosis, cancer is the most important single disease dealt with by the Registrar-General; for pneumonia is a complex of diseases, and even then only caused in 1921 a death-rate of 110 per 100,000, as compared with 122 from cancer. The registered death-rate from cancer has increased more than threefold since 1861. The sites of fatal cancer are given in a separate table. Among males and females alike cancer of the stomach heads the list. Cancer of intestines comes next in men, and so in women also, but cancer of the breast and of the uterus cause an almost equal number of deaths, without any corresponding mortality of moment in men. There is a great excess of cancer in the upper digestive tract of males. In cancer of lip (6 times), of mouth (4 times), of tongue (nearly 11 times), of jaw (4 times), and of pharynx, 2½ times as many deaths occur in men as in women. The corresponding English figures raise the problem as to whether cancer of some parts of the body is not increasing, while that of other parts is not. Furthermore, to what factors are we to ascribe this excessive proneness to cancer of certain tracts in man? Is it tobacco, or secondary effects of syphilis, or the local irritating effect of strong alcoholic drinks, or all of these in varying proportions? The answer cannot be given with any confidence. If tobacco-smoking becomes much more general in women, there may occur an approach to a check experiment, so far as tobacco is concerned.

Many other subjects of interest are dealt with in this report, but we need only refer to the very useful Appendix IV, giving the new international classification of causes of death of 1921, in parallel columns in comparison with the corresponding classification of 1911.

Correspondence.

"Audi alteram partem."

SMALL-POX AND AMAAS.

To the Editor of THE LANCET.

SIR,—In your issue of Oct. 14th last (p. 808) Dr. J. A. Mitchell proclaims me as the chief exponent of the "amaas, a separate and distinct disease" theory, giving as a reference my paper Amaas or Kafir Milk-pox (THE LANCET, 1904, i., 1273). I definitely decline responsibility for a view I have never held or expressed. Indeed, it seems remarkable that any responsible critic could read such an interpretation into the following passages which summarise my paper in THE LANCET to which Dr. Mitchell refers. After pointing out that amaas could not well be confounded with varioloid varicella and the infectious disease in Lascars, the article goes on to say—

"When compared with variola such a definite statement cannot be made, for it will be seen that amaas resembles small-pox in many particulars, the differences which exist between these two diseases appear to consist more in degree of virulence than of kind. The provisional conclusion arrived at on the relationship of amaas to variola is that the former *is small-pox* mitigated by some undetermined factor or factors."

For the vindication of my personal view I would not trespass on your space, but as the whole subject is shrouded in confusion I may perhaps be allowed to assist in removing some of the obscurity attending it. To narrow the issue reference will be confined to a few of the more definite aspects of the subject.

In the present state of knowledge no one can affirm what the relationship between small-pox and amaas really is. It may be conjectured and held that the weight of evidence is in favour of their identity, or the converse view may be believed, but demonstrable proof either one way or the other is lacking and is probably hidden in the unknown ætiological agent of small-pox. The history of medicine shows conclusively the fallacy of assuming diseases to be identical until they have been traced to a single definite cause. That the death-rate of amaas is low compared to the mortality-rate of classical small-pox is practically certain. If we take the death-rate of amaas as set out in Dr. Mitchell's paper, Table I., it will be found to work out for white and black, unvaccinated and prevaccinated, of a total of 17,000 odd cases extending over a period of 13 years to be 3·73 per cent. This aspect has been endorsed by various authors in different parts of the world who have recorded their experiences of the disease under the term "alastrim" or other name. A second fact which appears to be certain is that Jennerian vaccination is a preventive measure for amaas as for small-pox.

The next question and one of great importance still remains to be decided. Does amaas breed true to type—that is, does it remain a fairly non-lethal disease or can it, for some unknown reason, become virulent small-pox? Table I. in Dr. Mitchell's paper above referred to on the whole lends colour to the view that for the greater portion of 13 years the disease was true to this low mortality type. It would also appear from the history of this disease endemic among the natives for generations who show no very great concern for it that in the main it is true to the low mortality type. Dr. J. C. McVail believes that the mild type may coexist side by side with a virulent type such as occurred in the provinces and London in 1902 and 1905 respectively.

With such a moderate amount of fact to substantiate its claim to a special term in nosology, it may well be asked whether it would not be wiser to confine ourselves to the term mild small-pox rather than employ a distinctive name like amaas, yet we cannot be sure that the virus of small-pox and amaas are dentical and do not differ from one another in some respect. If we are not justified in assuming the identity of the virus in the two cases, neither can we deny the possibility of their being different. In the analysis of small-pox and amaas we are confronted by certain differences the sum and total of which, measured by the end-result—namely death—are widely different. As investigators of disease we are concerned with the reason why two such apparently similar diseases should have such different mortality-rates and the only feasible view would seem to be that there is more than one strain of variola virus.

On the whole the evidence, such as it is, seems to warrant the view that there is a variety of small-pox of a mild or mitigated type, nor does there appear to be any inherent improbability in such a surmise.

I am, Sir, yours faithfully,

Cape Town, Dec. 15th, 1922. W. E. DE KORTE.

CONGENITAL ABSENCE OF THE SPLEEN.

To the Editor of THE LANCET.

SIR,—The annotation in THE LANCET of Dec. 30th, 1922, on congenital absence of the spleen as being one of the rarest visceral anomalies, prompts me to report my notes upon the following case:—

Miss M., aged 24, previously healthy in every way, came over by train to visit some friends in York for the day on Sept. 1st, 1906, which was one of the hottest days recorded for several years—the thermometer registering 92° F. at midday. At 2.30 P.M., on getting up to say good-bye to her friends after a light meal, staggered and became unconscious. Seen half an hour later, she was clearly suffering from a cerebral hæmorrhage, and after the expiration of an hour breathing suddenly ceased, while the heart continued to beat for a few minutes till death ensued.

At a post-mortem made 28 hours after death, an extensive hæmorrhage into the fourth ventricle was discovered, breaking into both lateral ventricles and into the substance of the brain. No focus of hæmorrhage and no aneurysmal dilatations of the arteries of the brain could be discovered. The valves of the heart were perfectly healthy, as also were the lungs, liver, and kidneys, and there was no evidence of infarcts.

Beyond a very small accessory spleen, no spleen could be discovered in spite of a careful and detailed search. It appears a reasonable hypothesis that the absence of spleen, the abnormal heat, and the hæmorrhage at this unusual early age, stand in correlative association.—I am, Sir, yours faithfully,

G. A. AUDEN, M.D. Camb., F.R.C.P. Lond.,
School Medical Officer for Birmingham.

Jan. 3rd, 1923.

GASTRIC AND DUODENAL ULCER AS A FAMILIAL DISEASE.

To the Editor of THE LANCET.

SIR,—In connexion with Dr. A. F. Hurst's address in your issue of Dec. 30th on "Hypersthenic Gastric Diathesis," and his view of gastric and duodenal ulcer as a family disease, it might be interesting to record the fact that I have operated on—and definitely proved in consequence—four members of a family: father and son with duodenal ulcer, one perforated; daughter with gastric ulcer, and an uncle on the mother's side with duodenal ulcer. The mother had gastric ulcer operated on by another surgeon.

I am, Sir, yours faithfully,

Edinburgh, Jan. 5th, 1923. J. W. DOWDEN.

BACTERIOLOGY IN ANCIENT CHINA.

To the Editor of THE LANCET.

SIR,—In the last issue of THE LANCET (p. 38) the question was raised whether more than 1000 years ago the Chinese had knowledge of micro-organisms of disease, and it was justly remarked that many of our inventions and discoveries are found on inquiry to have been anticipated, wholly or in part, by the

race possessing the oldest existing civilisation. With such examples as the mariner's compass, gunpowder, printing, and (according to an eminent sinologue) a flying-machine before our eyes, it is not surprising that readers of Mr. Werner's recent work[1] should speculate on the possibility of some bacteriological notions having existed in sixth-century China. Indeed, though investigation proves the surmise untenable so far as it is based on Mr. Werner's book, there are reasons, to be explained later, why it is less fantastic than it might at first sight appear.

The original source of Lü Yüeh's exploits in attempting to spread pestilence among his enemies is a long, popular romance, narrating many deeds of martial valour in which gods, demi-gods, fabulous mortals, and some known to history take part. It is entitled "*Fêng shên yen i.*" Nothing certain is known of its author or date, but the edition of 1695 was probably the first printed. In dealing with myths of epidemics, Mr. Werner follows almost word for word Father Doré's abridged versions,[2] published in 1915, of several episodes taken from this romance. Unfortunately, he has failed to correct many of Father Doré's mistranslations, of which the sentence about "plague microbes" is one. Reference to the Chinese text[3] shows that the term used is *wên-i chung*, which means "pestilence bell"; and, indeed, there is in some editions a picture of Lü Yüeh holding in one of his six hands a bell of the kind used in magic and religious ritual to the present day. It is natural that the Western reader, without a specialised knowledge of things Chinese, should look for some evidence of the alleged "plague microbes" in the picture illustrating Mr. Werner's chapter on epidemics, and that he should have his expectations satisfied by finding there a number of strange comma-like or horseshoe-like objects floating in the air. But these are, in fact, merely examples of a pictorial convention denoting flames, such as has been practised by Chinese artists from earliest times. They represent the fire which Yang Jên, with his magic fan, caused to blaze forth and destroy Lü Yüeh, not germs of disease showered down by the latter on his foe.

It has been hinted above that possibly the Chinese at an early date were acquainted with organisms invisible to the naked eye. The suggestion is founded primarily on certain texts which seem to indicate the making of glass and lenses, and it is encouraged by the finding of glass objects, the design and provenance of which are consistent with an attribution to the Han dynasty (B.C. 206–A.D. 220). The ancient literature on the subject is mixed up with that on metallic mirrors used chiefly for kindling fire; hence there is danger of confusing terms of which the precise meanings have been lost. In a book, dating from the eleventh century B.C., and concerned with the regulation of rites and ceremonies, there is a passage stating that the officials for supervising light received the rays of the sun with a *fu-sui*. Native commentators declare this to have been the same as a *yang-sui*, a burning-glass or burning-mirror. Uncertainty whether a lens or mirror is meant seems to be cleared up to some extent by the first-century writer, Wang Ch'ung, who discourses on many institutions and beliefs of antiquity in a spirit of carping incredulity. But even he appears to accept the tradition that burning-glasses used for bringing down fire from the sun were made by fusing five kinds of "stone" or earthy substances. A Western parallel might be instanced in some ingredients of our own glass at the present day—viz., silica, lead oxide, potash, lime, and clay.[4] Without going further into this subject, it may be stated that the balance of evidence seems to favour the conclusion that in very ancient times the Chinese made glass, and, moreover, understood the properties of a lens. It is not stretching imagination very far to suppose that they used its magnifying powers to perceive things scarcely visible to the naked eye. Indeed, one might, after searching, find sufficient justification for a claim that telescopes were employed in ancient China for astronomical investigation (if such a thesis has not been advanced already). On the other hand, it appears very much less probable that anything in the nature of a microscope of high power existed or that the micro-organisms of disease were known in China prior to Western discoveries.

Your note entitled "Primitive Bacteriology," which gives rise to this letter, contains an anachronism connecting Fu Hsi with the sixth century A.D. Fu Hsi is a legendary emperor, said to have lived nearly 3000 years B.C. There is, too, a somewhat misleading suggestion that the main literary sources of Mr. Werner's book are "innumerable Chinese MSS." As that author frankly acknowledges, he quotes many long passages from the publications of Father Doré and Prof. H. A. Giles, and his chief native authorities are four or five comparatively modern printed books in common circulation. A vast mass of literature yet remains to be explored before an understanding be obtained of ancient Chinese medicine, myth, and legend.

I am, Sir, yours faithfully,

Jan. 6th, 1923. W. PERCEVAL YETTS.

[1] Myths and Legends of China. London: Harrap. 1922.
[2] Recherches sur les Superstitions en Chine, x., 811–821.
[3] Fêng shên yen i, lviii., 34.
[4] v. Forke, Lun-Hêng, i., 378; ii., 351, 496.

A DISCLAIMER.

To the Editor of THE LANCET.

SIR,—As the author of a book, designed solely for medical men, on "Mistakes and Accidents of Surgery," may I have the hospitality of your pages in order to disclaim any connexion with the notices of that book which have appeared in the public press? I wish it to be known that I have not granted any interviews to journalists, nor have review copies of the work been forwarded to the lay newspapers.

I am, Sir, yours faithfully,

Portsmouth, Jan. 8th, 1923. HAROLD BURROWS.

Obituary.

DAVID GEORGE THOMSON, C.B.E., M.D. EDIN.,

LIEUTENANT-COLONEL, R.A.M.C.

THE medical profession in Norwich has sustained a serious loss through the death on Jan. 4th of Dr. David Thomson, at the age of 66 years.

Dr. Thomson was born in Edinburgh and received a many-sided education, including courses at the College of Dunkirk and the Military School at Dresden. He took his M.D. with honours at Edinburgh University in 1881, thereafter devoting his attention to the study of mental disease. Having held the appointments of assistant medical officer in Derby County Asylum, Camberwell House, London, and the London County Mental Hospital at Cane Hill, he was appointed in 1886 to the medical charge of the Norfolk County Asylum at Thorpe, the senior county asylum, where he did his life-work. When he went there, the hospital afforded accommodation for 699 patients; on his resignation in 1922 numberless extensions and improvements had been carried out, and room found for over a thousand patients.

In March, 1915, the Thorpe Hospital was taken over by the War Office for the treatment of sick and wounded soldiers, the mental patients all being transferred elsewhere within a period of 12 days. Dr. Thomson, as officer-in-charge, superintended the structural alterations involved in the conversion of an asylum into a first-rate military hospital of 1000 beds, which involved an outlay of £16,000. After a year the accommodation was doubled by the erection of ten hutment wards, each of 60 beds, and some outdoor sleeping shelters. In the spring of 1918 a further hospital camp for about 500 men was added, raising the total available accommodation to 2428 beds, a number which was maintained until demobilisa-

tion in April, 1919. Altogether 44,651 officers and men were admitted, the total deaths during the four years numbering 423, or only 0·9 per cent. of the admissions. In addition to this heavy responsibility, Dr. Thomson was also asked to take over the military control of the 60 auxiliary hospitals in Norfolk to which convalescent cases were sent. When his war service was over Dr. Thomson was allowed to retain the honorary rank of Lieut.-Colonel, R.A.M.C., and was granted the C.B.E. On his final retirement from the Thorpe Hospital after 35 years of service, Dr. Thomson continued to act as medical adviser to the County Mental Deficiency Committee. He had been for many years an honorary consulting physician to the National Association for the Feeble-minded, and for five years he presided over the Medico-Psychological Association. Although his period of presidency coincided with the war he lost no opportunity of pressing for such urgent reforms as post-graduate training in psychiatry, improvement in the conditions of the asylum medical service, and provision of out-patient mental clinics.

In a county like Norfolk it is natural that Dr. Thomson's pastimes should have been yachting and camping, and he was an acknowledged authority on the natural history of the district. His love of music served him in good stead in institutional work, he organised excellent productions of Gilbert-Sullivan opera, his company on one occasion appearing for a week at the Norwich Theatre.

HARRY RAINY, M.D., C.M., F.R.C.P. EDIN., F.R.S. EDIN.

Dr. Harry Rainy, who died at his residence in Edinburgh on Jan. 4th, was in his sixtieth year, and had been in failing health for some time. He came of medical descent. Son of the late Dr. George Rainy, of Glasgow, his grandfather was professor of medical jurisprudence in Glasgow University. Dr. H. Rainy was educated first at the Edinburgh Academy and afterwards at the University, where he graduated M.B., C.M. in 1891, taking the first place in the honours list and holding the Ettles Scholarship awarded to the most distinguished graduate of the year. In the next few years he went on to take his M.D. degree and the M.R.C.P. Edin., being later elected a Fellow. He became a Fellow of the Edinburgh Royal Society, and in 1907 he was honoured by the University of Upsala with the M.D. hon. caus.

Dr. Rainy's appointments were all held in Edinburgh. He was first resident medical officer to the Chalmers' Hospital, then physician to the New Town Dispensary, and medical electrician to the Royal Hospital for Sick Children. He soon was elected to the medical staff of the Royal Infirmary, where he was physician, third in seniority, at the time of his death. A year ago he was appointed medical adviser to the Prison Commission in Scotland, and quite recently succeeded the late Sir James Affleck as physician to the Longmore Hospital. The medical school made him lecturer in the principles and practice of medicine, and he also lectured at the University on physical methods in the treatment of disease. He took an active part in the work of the Royal College of Physicians of Edinburgh as hon. secretary and examiner, and only a few months ago retired from the office of vice-president. He also examined in medicine at the University of Aberdeen.

But although Dr. Rainy's voice was only heard by Edinburgh students his teaching reached a vastly wider circle, for he was joint author with Dr. R. Hutchison of "Clinical Methods," a book which first appeared in 1897 and which has profoundly influenced medical practice. It was not designed as a treatise on diagnosis, but simply to set out the methods of clinical investigation by which alone correct diagnosis can be reached. To this book Dr. Rainy contributed the sections on electrical examination of muscle and nerve, on alimentary parasites, on the microscopy of the urine, and on clinical bacteriology, as well as the more general chapters on the circulatory and respiratory systems. The book has passed through seven editions and has long been familiarly known by the names of its authors. To-day, when "clinical pathology" is part of the regular curriculum and handbooks to it of all sizes abound, the pioneer work in this field of Dr. Rainy and his colleague is worth remembering with gratitude.

In other than medical work Dr. Rainy brought to bear an accurate and logical mind. He was an elder in the United Free Church and discriminatingly interested in various kinds of philanthropic work.

He remained unmarried.

Medical News.

UNIVERSITY OF VIENNA.—A post-graduate course on diseases of the skin and venereal diseases will be held from Feb. 12th to 24th, followed by a practical course from Feb. 26th to March 3rd. Those interested are invited to communicate with Dr. A. Kronfeld, 22 Porzellangasse, Vienna IX. Post-graduate instruction in all branches of medicine and surgery is being given during this session under the auspices of the faculty of medicine. The bureau of information as regards these courses is at 8 Frankgasse, Vienna IX.

ROYAL SANITARY INSTITUTE.—A meeting will be held on Feb. 2nd and 3rd in the University, Edmund-street, Birmingham, when a discussion on Town and Country Milk Supplies: What is Needed for their Improvement, will be opened by Dr. John Robertson at 7.30 P.M. Prof. H. R. Kenwood will preside. On Feb. 3rd a visit will be paid to milk plants to demonstrate methods of pasteurisation and sterilisation and bottling.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.—A meeting will be held at the Miller General Hospital, Greenwich, to-day, Friday, Jan. 12th, at 8.45 P.M., when Dr. W. H. Payne, the President, will occupy the chair. Dr. Hildred Carlill will show the following cases: (1) Syphilis of the Nervous System and Encephalitis Lethargica; (2) Plantar Ulcers in Diabetes Mellitus; (3) Tabes Dorsalis with Charcot's Disease of the Tarsus. Dr. E. P. Cumberbatch will show (1) Epithelioma of the Skin treated by Diathermy; (2) Black Mole in course of treatment by Fulguration. Cases will also be shown by Dr. Arthur Davies and Dr. H. Nockolds.

PROFESSORSHIP OF PHYSIOLOGY, TRINITY COLLEGE, DUBLIN.—The Visitors of Dublin University have sanctioned a decree of the Board of Trinity College establishing a chair of Physiology in the College. Up to the present the duty of teaching physiology has been on the King's Professor of the Institutes of Medicine, who is appointed, under the School of Physic Acts of 1800 and 1867, by the President and Fellows of the Royal College of Physicians of Ireland. It is understood that the Board of Trinity College will appoint the existing King's Professor to the new chair, so that he will occupy both chairs. No difficulty is likely to arise during his tenure of office, but when the necessity for a fresh appointment occurs it is possible that the two institutions will not see eye to eye. While not actually opposing the decree establishing a new chair in Trinity College, the President and Fellows of the Royal College of Physicians made it clear that they took no responsibility for the step, and that they had no power to diminish their discretion in the choice of a King's Professor.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC.—A post-graduate course will be held from Jan. 22nd to March 23rd. Lectures on the Pathology of the Nervous System will be given by Dr. J. Godwin Greenfield on Mondays, at 12 noon, and lectures on the Anatomy and Physiology of the Nervous System will be given if sufficient entries are received. Out-patient clinics will be held on Mondays, Tuesdays, Thursdays, Fridays, at 2 P.M., and clinical lectures and demonstrations on the same days at 3.30 P.M. Those taking part in the course include Dr. James Taylor, Dr. Grainger Stewart, Dr. W. J. Adie, Dr. S. A. Kinnier Wilson, Dr. F. M. R. Walshe, Dr. Gordon Holmes, Dr. P. W. Saunders, Dr. C. M. Hinds Howell, Dr. Aldren Turner, Mr. T. H. Just, Dr. J. S. Collier, Mr. Leslie Paton, Dr. Risien Russell, Mr. Sydney Scott, Mr. D. J. Armour, Dr. L. D. Bailey, and Mr. P. Sargent. The fee for the whole course, including anatomy and physiology, is £12 12*s.*; but these lectures may be taken separately for a fee of £4 4*s.* Course without anatomy and physiology lectures will be £10 10*s.* Any part of the course may be taken separately at a special fee. Fees should be paid to the Secretary of the Hospital, Queen-square, Bloomsbury, on entering for the course.

Messrs. Cassell announce the forthcoming appearance of a new book by Sir Frederick Treves under the title "The Elephant Man and other Reminiscences."

LONDON DERMATOLOGICAL SOCIETY.—A meeting will be held at 4.30 P.M. on Jan. 16th, at St. John's Hospital, 49, Leicester-square, London, W.C. 2, when Dr. M. G. Hannay will communicate some remarks on urticaria.

The *Chesterfield Lectures*, founded in 1895 to promote the study of dermatology, are being held at St. John's Hospital on Thursdays at 5 P.M., and are free to practitioners. The next lecture will be given on Jan. 18th by Dr. W. K. Sibley on Electrical Treatments and Diathermy.

THE LATE DR. F. J. PEARSON.—The death occurred on Jan. 2nd, at the age of 59, of Dr. Francis James Pearson, who had practised medicine at Owston Ferry, Lincolnshire, for nearly 20 years. Dr. Pearson qualified M.R.C.S., L.R.C.P. from St. Mary's Hospital in 1896, and became house surgeon to the Barrow-in-Furness Hospital in the same year. During the Boer War he worked as a civil surgeon at Netley Hospital and later volunteered for plague duty in India, where he served for 18 months. He then settled at Owston Ferry and was there much beloved.

JENNER CENTENARY EXHIBITION.—In connexion with the commemoration of the centenary of the death of Dr. Edward Jenner, on Jan. 26th, the Wellcome Historical Medical Museum is arranging a special exhibition of personal relics, pictures, engravings, drawings, documents, MSS., and letters relating to the discovery of vaccination. Anyone willing to lend objects of interest is asked to communicate with the Curator at 54A, Wigmore-street, London, W. Loans while on exhibition will be insured and any expense incurred in transit will be paid by the Museum. The exhibition is to be opened on Jan. 26th and to remain open for some months.

BELGIAN SOCIETY OF GYNÆCOLOGY AND OBSTETRICS. An invitation has been received from the members of this Society addressed to their British colleagues. In this the secretary-general of the Society announces that any members of the Section of Obstetrics and Gynæcology of the Royal Society of Medicine, or of societies of similar aim and scope, will be made welcome at the meetings of the Belgian Society if they visit Brussels. The meetings of the Belgian Society are held in the afternoon of the first Saturday of each month at 3, rue du Maelbeek, Brussels, and the officers of the Society for the current year are: Dr. Edmond Rouffart, President; Dr. Jean-Louis Henrotay, Vice-President; Dr. H. E. Nisot-Wuyts, Treasurer; and Dr. Max Cheval, 37, rue Joseph II., Brussels, is the Secretary-General.

DOCTORS AND DENTISTS UNDER THE DANGEROUS DRUGS ACT.—The Home Office has issued a memorandum defining the duties and obligations of the registered medical man and dentist in regard to the Dangerous Drugs Act of 1920. Two clauses in this memorandum call attention to the penalties which may be incurred by non-observance of the regulations.

A doctor or dentist who obtains, or attempts to obtain, the drugs for a purpose not covered by his authorisation, or who infringes any of the regulations, commits an offence against the Act, and, if convicted, is liable to a fine of £200, or to imprisonment, with or without hard labour, for six months, or to both fine and imprisonment.

Further, the Home Secretary has power, after the conviction of any doctor or dentist, to withdraw from him his authorisation; the effect of this would be to deprive him entirely of the right to be in possession of or to supply the drugs.

The memorandum is to be printed as a pamphlet and issued for sale by H.M. Stationery Office.

ROYAL INSTITUTE OF PUBLIC HEALTH.—A course of ten lectures on tuberculosis and venereal disease will be delivered in the Lecture Hall of the Institute, 37, Russell-square, London, W.C., on Wednesdays, at 4 P.M., starting on Jan. 17th. The first lecture will be delivered by Prof. S. Lyle Cummins on the Need of Research to Guide the Framing of Tuberculosis Schemes. On Jan. 24th Dr. W. T. Gordon Pugh will speak on Surgical Tuberculosis in Children, and on Jan. 31st Dr. A. Lisle Punch on Laboratory Methods in the Investigation of Tuberculosis. Dr. James Watt will deal with Principles and Practice of Sanatorium Treatment on Feb. 7th, and Dr. A. Hope Gosse with Public Health Aspects of Pulmonary Tuberculosis on Feb. 14th. The five lectures on Venereal Disease will include the organisation and administration of venereal disease schemes, venereal clinics—their function and organisation, venereal disease under army organisation, the prevention of congenital syphilis, and the industrial menace of syphilis, by Colonel L. W. Harrison, Mr. E. R. Townley Clarkson, Major A. T. Frost, Dr. J. H. Sequeira, and Dr. W. J. O'Donovan, respectively. Admission is free to medical men and others interested in the subjects.

TUBERCULOSIS SOCIETY.—A meeting of this society will be held at Margaret-street Hospital, London, W. 1, on Monday, Jan. 15th, at 7.30 P.M., when Dr. James Crocket will read a paper entitled A Survey of Ten Years' Work in Tuberculosis.

ROYAL STATISTICAL SOCIETY.—A meeting will be held at 5.15 P.M. on Tuesday, Jan. 16th, in the Hall of the Royal Society of Arts, John-street, Adelphi, London, W.C. 2, when Dr. R. Dudfield will open a discussion on the Registration of Disease.

HASLEMERE AND DISTRICT HOSPITAL.—This hospital will be opened on Jan. 20th, at 2 P.M., by Viscount Cave. It contains 35 beds, including a maternity ward and X ray department, and has been built and paid for at a cost of over £32,000.

SIR NORMAN WALKER.—The Scottish Board of Health has recorded its deep satisfaction that the honour of knighthood should have been conferred on Dr. Norman Walker, to whom the Board has been frequently indebted for valuable assistance and advice—more especially in his capacity first as vice-chairman and latterly as chairman of the Medical and Allied Services Consultative Council.

MEDICAL PRAYER UNION.—A meeting will be held, by invitation of Dr. J. Burnett Rae, at 98, Portland-place, London, W. 1, on Thursday, Jan. 25th, at 8 P.M., when Right Rev. E. A. Knox, D.D., late Bishop of Manchester, will read a paper, and Miss Muriel Michell will sing. Intimation of intention to be present should be addressed to the hon. secretary, Dr. Tom Jays, Livingstone College, Leyton, E. 10.

DUBLIN (83RD) GENERAL HOSPITAL.—Nineteen members of the Dublin (83rd) General Hospital staff met at the annual dinner on Jan. 6th, at Mills's Hall, under the presidency of Colonel Sir William Taylor, K.B.E., who had organised the team. Since their previous dinner the team has lost one member, Mr. Edward Taylor, who died last April. Dr. A. R. Parsons was prevented from attending by illness and Dr. E. J. M. Watson by an accident, whilst others, who lived at a distance, were unable to make the journey to Dublin under present conditions. Among the members of the team present was Major-General M. R. J. Hayes, the Director-General of the Army Medical Service of the Free State. Replying to the toast of his health, General Hayes thanked his late colleagues for the cordial help given to him and to the soldiers of the Free State Army by the staffs of the several Dublin hospitals.

VOLUNTARY HOSPITALS COMMISSION.—At a meeting of representatives of local voluntary hospital committees held in July last, it was decided to adopt a proposal made by the Voluntary Hospitals Commission to establish a small consultative committee of members of local committees. The purpose of this committee is to provide a body closely in touch with local opinion, to which the Commission could refer for assistance and advice. The Commission, after inviting nominations from local hospital committees, have now appointed the following to be a consultative committee for England and Wales: Rt. Hon. F. D. Acland (Devonshire), Alderman E. C. Barnes (Derbyshire), Capt. W. Best (North Wales), Mr. J. J. Cockshott (Lancashire), Rev. G. B. Cronshaw (Berks, Bucks, and Oxon.), Mr. H. N. Crouch (Somerset), Sir James Curtis (Birmingham and Gloucestershire), Mr. Walter Davies (Manchester), Sir David Drummond, M.D. (Northumberland), Mr. H. W. C. Drury (Norfolk), Sir Henry Hadow (Sheffield), Mr. Noel Hanbury (Hampshire), Viscount Lascelles (East and West Ridings of Yorkshire), Col. R. J. S. Simpson, M.B. (Kent), Sir A. Garrod Thomas, M.D. (Monmouthshire), Bishop Welldon (Durham).

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. M. L. Rodd is placed on the retd. list with rank of Surg. Rear-Admiral.

The following Surg. Comdrs. have been placed on the retd. list with the rank of Surg. Capt.: E. S. Tuck, W. E. Mathew, W. H. O. Garde, A. H. H. Vizard, J. Boyan, J. A. Forrest, A. X. Lavertine, and J. W. Craig.

The following appts. have been notified:—Surg. Capts.: R. F. Clark to *Maine*; F. H. Nimmo and W. E. Ormsby to *Vivid*, for R.N. Barracks; R. J. MacKeown to *Pembroke*, for R.N. Barracks. Surg. Comdrs.: F. H. Stephens to *Victory*, for R.N. Barracks; F. H. Holl to *President*, addl. temp., for R.N. College and School, Greenwich; R. Hughes to *Dido*; and C. G. Sprague to *Constance* on recommissioning. Surg.-Lt. Comdrs. J. B. Crawford to *Courageous*, temp.;

and T. J. O'Riordan to *Dido*. Surg.-Lts. E. J. Benson to *Cyclops*; T. N. D'Arcy to *Egmont* and for Malta Dockyard; and W. E. Heath to *Ceres*.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. A. M. MacLaughlin retires on retd. pay and is granted the rank of Col.

Capt. J. E. Hepper retires, receiving a gratuity, and is granted the rank of Maj.

MILITIA.

Capt. R. Forgan relinquishes his commn. and retains the rank of Capt.

TERRITORIAL ARMY.

Capt. A. S. Bruzaud to be Maj.

Capt. C. W. Dudley (late R.A.M.C., Spec. Res.) to be Capt.

Capt. F. G. L. Dawson to be Adjt. (S. Middlesex) Divn., R.A.M.C., T.A.

Capts. H. S. Wallace and A. J. Walton relinquish their commns. and retain the rank of Capt.

Capt. J. A. Paterson resigns his commn. and is granted the rank of Maj.

General Hospitals: Capts. H. A. Lucas and P. R. Bolus, from Genl. List, to be Capts.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.
List of probable papers:—THURSDAY, Jan. 18th.—J. Barcroft: Observations on the Effect of High Altitude on the Physiological Processes of the Human Body. Prof. F. W. MacBride: Some New Light on the Inheritance of Acquired Characters. C. F. Cooper: *Baluchitherium osborni* (? syn. *Indricotherium turgaicum*, Borrissyak). (Communicated by Dr. A. S. Woodward). J. A. Gunn and K. J. Franklin: The Sympathetic Innervation of the Vagina. (Communicated by Sir Charles Sherrington). H. G. Cannon: On the Metabolic Gradient of the Frog's Egg. (Communicated by Prof. E. W. MacBride). Basiswar Sen: On the Relation between Permeability Variation and Plant Movements. (Communicated by Sir William Baylise). H. L. Duke: An Inquiry into an Outbreak of Human Trypanosomiasis in a *Morsitans* Belt to the East of Mwanza, Tanganyika Territory. (Communicated by Mr. C. Dobell). Louis Dollo: Le Centenaire des Iguanodons (1822–1922). (Communicated by Prof. A. C. Seward.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Tuesday, Jan. 16th.

GENERAL MEETING OF FELLOWS: at 5 P.M.
Ballot for the election of Candidates.

PATHOLOGY: at 8.30 P.M.
Prof. M. J. Stewart and Dr. J. le F. C. Burrow: Malignant Spheno-Occipital Chordoma.
Dr. A. J. Eagleton and Miss E. M. Baxter: The Serological Classification of Virulent *B. Diphtheriæ*.
Dr. C. C. Okell and Miss E. M. Baxter: The Fermentative Reactions of Virulent *B. Diphtheriæ*.

NEUROLOGY:
Members of this Section are cordially invited to attend the above meeting.

Wednesday, Jan. 17th.

HISTORY OF MEDICINE: at 5 P.M.
Papers:
Mr. W. H. S. Jones: Medical Etiquette in Ancient Times.
Dr. Charles Singer: The Hippocratic Oath.

Thursday, Jan. 18th.

DERMATOLOGY: at 5 P.M. (Cases at 4.30 P.M.)
Cases will be shown.
Special Evening Meeting at 8.30 P.M.
Papers:
Dr. J. W. McNee and Dr. A. M. H. Gray: A Chemical and Histological Study of a Case of Sclerema Neonatorum.
Dr. J. E. R. McDonagh: On the Use of Manganese as a Chemo-Therapeutic Preparation.

Friday, Jan. 19th.

OTOLOGY: at 5 P.M. (Cases at 4.45 P.M.)
Demonstration:
Dr. Logan Turner and Dr. J. S. Fraser: Labyrinthitis as a Complication of Middle-Ear Suppuration.
Cases:
Sir James Dundas-Grant will show a case of Vertigo with Fixation of Ossicles; cured by Ossiculectomy.
Other cases and specimens will be shown.

ELECTRO-THERAPEUTICS: at 8.30 P.M.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 11, Chandos-street, Cavendish-square, W.
THURSDAY, Jan. 18th.—8.15 P.M. (preceded by a demonstration at 7.45 by Dr. A. C. Stevenson, on the Pathology of the Brain in Sleeping Sickness).
Papers:
Dr. George C. Low and Dr. Philip Manson-Bahr: The Treatment of Human Trypanosomiasis by "Bayer 205."
Dr. A. C. Stevenson: The Pathology of the Brain in Sleeping Sickness.
Dr. C. Morley Wenyon: The Trypanocidal Action of the Serum and Cerebro-Spinal Fluid of Cases Treated by "Bayer 205"; and on the Strain of Trypanosome Isolated from Case 9.
Dr. J. G. Thomson: Trypanocidal Action of the Urine in Case 9.
(Some of the treated cases will be present).
Dr. C. C. Chesterman (of the Belgian Congo): The Action of Tryparsamide in Sleeping Sickness: A Study of Forty Cases, with Special Reference to the Cerebro-spinal Fluid.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY, Jan. 15th.—11 A.M., Mr. Simmonds: Applied Anatomy. 2 P.M., Mr. Addison: Surgical Wards. 4 P.M., Dr. Saunders: Cretins and Athyroidism.
TUESDAY.—11 A.M., Dr. Paterson: Demonstration of Medical Cases. 12 noon, Dr. Burrell: Chest Cases. 2.30 P.M., Mr. Tyrrell Gray: Surgical Wards.
WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 2.30 P.M., Mr. Donald Armour: Surgical Wards. 4 P.M., Dr. Burnford: Clinical Pathology in Practice.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Department. 12 noon, Mr. Simmonds: Demonstration of Fractures. 2 P.M., Mr. Bishop Harman: Eye Department.
FRIDAY, 12 noon, Dr. Flett: Radiology. 2 P.M., Mr. Banks-Davis: Diseases of Throat, Nose, and Ear. 3 P.M., Mr. Sinclair: Surgical Cases.
SATURDAY.—9 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 11 A.M., Mr. Maingot: Surgical Pathology.
Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M.: In-patients, Out-patients, Operations, Special Departments.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, Marylebone, W.
(Post-graduate Intensive Course in Cardiology: final week.)
Monday, Jan. 15th.—10 A.M., Dr. Parsons-Smith: The Electrocardiograph. 11.15 A.M., Dr. F. W. Price: Angina Pectoris. 2 P.M., Dr. R. O. Moon: Ward Demonstration. 3 P.M., Dr. J. Strickland Goodall: Out-patients.
TUESDAY.—10 A.M., Dr. F. W. Price: Diseases of the Myocardium. 11.15 A.M., Dr. J. Strickland Goodall: Aortic Disease. 2 P.M., Dr. F. W. Price: Ward Demonstration. 3 P.M., Sir S. Russell-Wells: Out-patients.
WEDNESDAY.—10 A.M., Dr. Parsons-Smith: Heart Block. 11.15 A.M., Dr. P. Hamill: Congenital Heart Disease. 2 P.M., Dr. H. B. Weir: Pathological Demonstration. 3 P.M., Dr. R. O. Moon: Out-patients.
THURSDAY.—10 A.M., Dr. R. O. Moon: Cardiac Arrhythmias. 11.15 A.M., Dr. F. W. Price: Diseases of the Arteries. 2 P.M., Dr. Parsons-Smith: Ward Demonstration. 3 P.M., Dr. F. W. Price: Out-patients.
FRIDAY.—10 A.M., Dr. J. Strickland Goodall: Tachycardia. 11.15 A.M., Dr. John Parkinson: Treatment of Heart Failure. 2 P.M., Sir S. Russell-Wells: Ward Demonstration. 3 P.M., Dr. John Parkinson: Out-patients.
SATURDAY.—10 A.M., Dr. P. Hamill: Ward Demonstration.

HOSPITAL FOR SICK CHILDREN, Great Ormond-st., W.C.
THURSDAY, Jan. 18th.—4 P.M., Dr. Still: Congenital Hypertrophy of the Pylorus.

ST. JOHN'S HOSPITAL, 49, Leicester-square, W.C.
THURSDAY, Jan. 18th.—5 P.M., Dr. W. K. Sibley: Electrical Treatments, Diathermy, &c.

ST. MARY'S HOSPITALS, Manchester.
The post-graduate lecture (at Whitworth-street West Branch), fixed for Jan. 19th, has been postponed to March 9th. There will not be any lecture on Jan. 19th.

Appointments.

MACKINTOSH, JEAN M., M.B., Ch.B. Edin., D.P.H., has been appointed Assistant Medical Officer of Health and School Medical Officer at Llanelly.

MCKERLIE, H., M.B., Ch.B. Glasg., House Surgeon, Clayton Hospital, Wakefield.

OSWALD, J. A. RAMSAY, M.B., Ch.B. Glasg., House Surgeon, Perth Royal Infirmary.

Certifying Surgeons under the Factory and Workshop Acts: WALLACE, H. S., M.B., Ch.B. Edin. (Nottingham, West District); FRANCE, W. H., M.D. Durh., L.R.C.P. Lond., M.R.C.S. (Selston); and LOWTHER, R. C., M.B., Ch.B. Edin. (Grange-over-Sands).

Vacancies.

For further information refer to the advertisement columns.

All Saint's Hospital for Genito-Urinary Diseases, Vauxhall Bridge-road, S.W.—Res. H.S. £160.

Belgrave Hospital for Children, Clapham-road, S.W.—Hon. Radiologist. 50 guineas. Also Anæsthetist. 25 guineas

Birmingham City.—Research Officer. £500.
Birmingham University, Faculty of Medicine.—Asst. Lecturer in Pathology. £300.
Chelsea Infirmary, S.W.—Second Asst. M.O. £325.
City of London Hospital for Diseases of Chest, Victoria Park, E.—Res. M.O. £250.
Colchester, Essex County Hospital.—Cas. O. and Path. £200.
Dartford, City of London Mental Hospital, near Dartford, Kent.—Second Asst. M.O. £350.
Derby County Mental Hospital, Mickleover.—Jun. Asst. M.O. £350.
Dreadnought Hospital, Greenwich.—H.P. £150. Also S. for Dis. of Throat, &c.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—H.P. £125.
Elizabeth Garrett Anderson Hospital, Euston-road.—Asst. Obstet.
Gloucestershire Royal Infirmary and Eye Institution, Gloucester.—Asst. H.S. £150.
Hospital for Consumption and Diseases of the Chest, Brompton.—Asst. Res. M.O. £150. Also H.P. £50.
Hove Hospital.—Res. M.O. £250.
King Edward VII. Sanatorium, Midhurst, Sussex.—Second Asst. M.O. £250.
Liverpool, David Lewis Northern Hospital.—Two H.P.'s and Four H.S.'s. Each £100.
London County Mental Hospital Service.—Seventh A.M.O. £300.
Maidstone, West Kent General Hospital.—H.S. £220.
Manchester, Ancoats Hospital.—Hon. Radiologist. £100.
Manchester Royal Infirmary.—Anæsthetist. £50.
Margate, Royal Sea Bathing Hospital for Surgical Tuberculosis.—Res. S. and Med. Super. £500.
Northampton General Hospital.—H.S. £200.
Rotherham Hospital.—Jun. H.S. £150.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Pathologist. £200.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. £80.
Scarborough Hospital and Dispensary.—H.S. £150.
Sheffield Royal Hospital.—H.S. to Ear, Nose, and Throat Dept. and Asst. Cas. O. £150.
Sheffield Royal Infirmary.—Ophth H.S. £150.
Sheffield University, Dept. of Path. and Bact.—Asst. Bact. and Dem. in Path. Each £300.
Shoreham, Sussex, Lancing College.—School Doctor. £500.
Staffordshire General Infirmary, Stafford.—H.S. £200.
University of London.—External Examiners, &c.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Hon. Asst. Surg.
Whittingham County Mental Hospital, near Preston, Lancs.—Asst. M.O. Also Asst. M.O. Pathologist. Each £149 13s.
Wigan Infirmary.—Hon. Asst. Physician.
Willesden General Hospital, Harlesden-road, N.W.—Hon. Anæsth.
Wrexham Infirmary.—H.S. £150.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointment: Cockermouth (Cumberland).

The Home Secretary gives notice that in consequence of the resignation of Mr. Henry Hind, one of the Medical Referees under the Workmen's Compensation Act, 1906, for the Harrogate, Ripon, and Tadcaster County Courts in Circuit No. 15, the appointment held by him is vacant. Applications for the post should be addressed to the Private Secretary, Home Office, and should reach him not later than Jan. 31st, 1923.

Births, Marriages, and Deaths.

BIRTHS.

ALLAN.—On Jan. 8th, at Primrose Mansions, Battersea Park, the wife of Dr. C. H. Allan, W.A.M.S., of a daughter.

SEDGWICK.—On Jan. 5th, at Lower Seymour-street, W., the wife of Dr. C. Humphrey Sedgwick, of Weedon, Northants, of a son.

THOMPSON.—On Jan. 6th, at Elmfield, Taunton, the wife of James Thompson, M.C., M.B., F.R.C.S. Eng., of a son.

MARRIAGES.

BOYD—ORR.—On Jan. 5th, at Dundas-street Congregational Church, Glasgow, William Ernest Boyd, M.A., M.D., to Kathleen Edith Gemmill, only daughter of Mr. James M. Orr, of Athole Gardens-place, Glasgow, W.

ORME—MACAULAY.—On Jan. 3rd, at St. Peter's Church, Ludlow, E. Stuart Orme, M.B., to Helen, second daughter of Mr. and Mrs. F. W. Macaulay, of Springfield House, Ludlow.

DEATHS.

GAITSKELL.—On Dec. 31st, 1922, at Westcliff-on-Sea, Herbert Ashley Gaitskell, M.D., aged 49.

PEARSON.—On Tuesday, Jan. 2nd, at Owston Ferry, Francis James Pearson, M.R.C.S., L.R.C.P., aged 59 years.

PRINGLE.—On Dec. 18th, at Christchurch, New Zealand, Dr. John James Pringle, M.B., C.M. Edin., F.R.C.P. Lond., for many years physician to the Middlesex Hospital, W., in his 68th year.

STEEN.—On Jan. 4th, at Broadway, Letchworth, Herts, William Carmichael Steen, M.D., in his 60th year.

THOMSON.—On Jan. 4th, at the residence of his son-in-law, R. M. Winder, Lingwood Lodge, near Norwich, Lieut.-Colonel David George Thomson, M.D., C.B.E., late superintendent of the Norfolk Mental Hospital, aged 66.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

SOME ECONOMIC FACTORS IN DENTISTRY.

BY A. BYGOTT, M.D. LOND., D.P.H.,
BARRISTER-AT-LAW; MEDICAL OFFICER OF HEALTH, COUNTY OF WEST SUFFOLK.

THE Dentists Act of 1921 came into operation on Nov. 30th, 1922, so that any person whose name is not on the Dental or Medical Registers will apparently now be prevented from practising dentistry under a penalty of £100. This Act has added nearly 8000 names to the 5000 and more already on the register under the Dentists Act of 1878. These changes, marking a new era, require a careful survey of the economic aspect of dentistry. The conflicting claims of the two schools of economics—one that the country cannot afford to pay for a proper dental service, the other that she cannot afford to do without it—require careful consideration. The following figures are taken from the annual report of the Registrar-General for 1920, which appear better suited to my present purpose than those obtained from the recent Census. The estimated population of England and Wales was 37,524,000, of these 3,280,117 were under 5 years of age, 7,515,793 between 5 and 15; 17,895,484 between 15 and 45, and 8,832,606 between 45 and 85. Each of these age-groups has its special dental difficulties. There were 294 deaths due directly to diseases of the teeth and gums, and 6 deaths under anæsthetics administered for the extraction of teeth. There are about 10 million insured persons in the country entitled to medical benefit which is supplied by about 11,000 panel doctors. The problem is to make everybody in this country realise the importance of dental treatment, to wish to procure this for themselves and for the rest of the community.

Present Provisions of Dental Service.

The following provision is made by public authorities for dental service. The education authorities in England and Wales numbering 316 employ 447 school dentists, many part-time only, who deal with a school population of about 6 million. Some dental work is done under maternity and child welfare schemes; some authorities, in connexion either with sanatoriums, or tuberculosis schemes, provide a limited amount of dental service. Some boards of guardians supply dental treatment for children under their care. Charitable assistance is available in special dental hospitals, or, to a more limited extent, in dental departments of general hospitals. The Surgical Aid Society and the Ivory Cross pay institutions or local dentists for service to poor people under their schemes. Dental assistance was regarded as a very appropriate additional benefit to be supplied after the friendly societies had obtained further experience by providing medical benefit under the Insurance Act, and were assured that funds were sufficient to provide additional benefits. There are, I am informed, about six dental clinics in the country registered under the Company's Act, managed and staffed by registered dentists, including those at Bournemouth, Brighton, Redhill, and Reading, for the supply of dental services to persons under a fixed income limit at a fixed scale. The object of these associations is to provide good treatment for the patients rather than to make a profit. Several friendly societies avail themselves of the services of the National Insurance Beneficent Society, which enables insured persons to obtain adequate dental service when needed. It will be seen, however, that a very large section of the population, many of whom are dependents on insured persons, are not provided for by the schemes. It is very important that both the medical and dental needs of this section of the population should be met. Owing to unemployment a large number of people lack the necessary food to keep them industrially efficient, and this is not a favourable time to ask for money for the provision of sound teeth with which to eat their insufficient food-supply. Nevertheless, the health and strength of many thousands of people is their only capital and anything which impairs their health is an attack on all that they possess, including their lives.

Dental Legislation.

A dental board has been established in charge of a registrar, and in future all persons practising dentistry must be registered. Many people think that dental practice consists either in pulling out teeth or in buying new ones, and they do not realise that by cleanliness, periodical inspection, and conservative treatment, they ought to preserve their natural teeth as long as possible. In 1878, when the first Dentists Act was passed, matters were much worse than they are now, but a great deal was being done to improve the national health. The Elementary Education Act of 1870, the Public Health Act, 1875, and the fusion of the Poor-

Law Board and Board of Health in the Local Government Board had followed the surgical revolution introduced by Lord Lister's antiseptic methods in the later "sixties." The first Dentists Act followed the lines of the Medical Act of 1859; unqualified practice was not prohibited, but the public was given an opportunity of knowing which practitioners were qualified and which were not. Unqualified medical practice is limited, owing to the possibility of prosecution for manslaughter, and the tightening up of death certification in 1874; but as the unqualified dentist's only disability was difficulty in enforcing the payment of fees, which might be got over by insisting on payment in advance, or by patients' ignorance of the law, the qualified dentist has been exposed to very unfair competition since the passing of the Dentists Act, 1878.

The Dental Register.

In 1918, 5524 names were on the Register, of which number 4214, or 75 per cent., were qualified as the result of licences from colleges or universities, and 1274 persons were registered at the time of the passing of the Act, in 1878, as engaged in the practice of dentistry. It is specially interesting to note that in 40 years 25 per cent. of the originally registered were still alive, although some of them must on account of old age have ceased to practise. In 1878 the proportion of dentists to the rest of the population was 1 to 6500 and in 1917 1 to 8500. In 1879 the population of the United Kingdom was 34,156,113, the number of names on Medical Register 22,600; in 1916 population was 46,431,546, and the number of names on the Medical Register 43,225. In 1918 about 2000 unqualified dentists belonged to dental societies; of these 1650 were members of the Incorporated Dental Society, an association of unregistered dentists which has endeavoured to regulate to some extent the conduct of its members. The number of unregistered practitioners registered up to November, 1922, was about 8000—a number considerably in excess of the registered dentists on the Register before the passing of the 1921 Act, as the door has been widely opened to the unqualified practitioner. The dentists with university or college qualifications in the Register are scattered over the British Isles and abroad; and many of them reside either in London or in populous and fashionable centres where they are likely to receive good fees for their work. In London, 75 practitioners are registered as residing in Harley-street and 45 in Wimpole-street. In East Ham, with its population of 133,000, there were no qualified men. In the county borough of Northampton, with a population of 87,000, there were 5 qualified and 20 unqualified men.

The Problem of Expense.

One of the witnesses before the Dentists Act Committee thought that a qualified dentist might, on the present basis of requirement, deal with a population of 4000. This would necessitate between 9000 and 10,000 dentists to deal with the population of England and Wales. The proportion of dentists to population would have to be much greater if the needs of the whole population were adequately met. If £1000 be taken as a basis for remuneration and working expenses of each dentist this would cost about £10,000,000. Such a system would involve regular distribution of dentists over the country, and the complete elimination of waste by competition, a condition which could not be realised. Every £100 added to the estimated cost of each dentist would make a difference of £1,000,000. (It is interesting to compare these figures with the cost of elementary education, which was estimated at £50,000,000 for 1922.) A very considerable portion of the money is being found at present from private sources, either through individual payments to dentists, or through public authorities for the dental services they provide. The Ministry of Pensions, the National Insurance Beneficent Society, the Surgical Aid Association, and the Ivory Cross usually pay fees to practitioners on about the following scale (taken from the National Insurance Beneficent Society): A partial denture of one to three teeth on vulcanite plate is £1; full or nearly full upper or lower denture is £3 5*s.*; complete upper and lower denture is £6; fillings 5*s.* with root treatment 12*s.* 6*d.* The fee for extractions with local anæsthetic is 2*s.* 6*d.* per tooth, and if under nitrous oxide gas, 5*s.* for anæsthetic and 2*s.* 6*d.* for each tooth extracted. There are, of course, very serious objections to the payment per tooth for multiple extractions. The wage of many agricultural labourers, and of many unskilled workers in the towns, is between £1 and 30*s.* a week, when employed, so that it is impossible for these people to pay even such moderate fees. Experience amongst panel or hospital patients in maternity and child welfare centres shows that the ordinary condition of working people's teeth is very bad indeed; it is impossible to leave the provision of dental service for them to private enterprise.

The question of providing for the poorer middle-class is very serious, as members of a very large number of families, including those of poorer members of the learned professions, are unable to provide or compelled to postpone treatment, owing to what are, to them, the high and uncertain fees of the ordinary dentist. A regular recognised scale of fees would be a great benefit, especially to this class of patient, and it may be that the scale adopted by the dental clinics already existing in a few towns or the National Insurance Beneficent Society may do something to stabilise dental charges. There is, of course, another side to this question: the ordinary out-of-pocket expenses of a dentist are very heavy, and when a man is in practice alone, his earning capacity is limited by his number of working hours. For instance, 7*s.* 6*d.* is considered by some people as a very heavy charge for filling a tooth, but as two interviews are often necessary, and possibly nearly half an hour is taken up in doing it, such a charge cannot be regarded as extortionate.

Education and Coöperative Effort.

The dentist's education is expensive. The calendar of the University of Birmingham shows that a student's expenses whilst obtaining the degree of B.D.S., including examination fees, amount to £186 12*s.*, and for the licence of Dental Surgery to £144 4*s.* 6*d.*; for a medical degree at the same university the expenses amount to £197. The duration of the course for both dental and medical degrees in this University is five years, and for the L.D.S. four years. During this time the student has to be maintained; at present cost of living, if he is not living at home, this would amount to from £100 to £150 per annum, so that the cost of dental education is about £1000, apart from the uncertainty of passing the necessary qualifying examinations. Patients when describing interviews, especially with unregistered dentists, often state that they have been told that the cost of the work must be high on account of the price of the materials used. Gold at the present moment is worth about £4 10*s.* per oz., ½ oz. goes a long way, and other materials such as vulcanite and stock teeth are quite cheap; these expenses afford no justification for the fees charged by some dentists on that account—but dental work must be expensive because of the value of the professional skill employed. Efficiency might be improved, and costs reduced, by coöperative effort. For instance, many dentists employ their own mechanics, the ordinary wage for a good mechanic being about £4 per week; the workshop may consist of a room in a basement or attic furnished with a second-hand lathe, blow-pipe, &c., with a few old saucepans and other household articles adapted for the purpose. At the same time the operation room may be very unsatisfactory; I saw some time ago in London, an unregistered dentist whose operating room reminded me of a fifth-rate barber's shop. The syringe used for local anæsthetics was lying on a dirty towel, and likely to be a serious danger to anyone for whom it was used. It would be much better if these places were more under the public eye, but in ordinary circumstances real coöperative effort could only be provided either through local authorities or by something in the nature of a company, and as the law is very wisely regulating companies engaged in dental practice, owing to scandalous abuses in the past, the formation of a company for the supply of efficient dental service presents serious difficulties. It is, however, being done at Bournemouth and at other places, as I have already mentioned. The following figures taken from the annual report of the Bournemouth and District Dental Clinic for 1921 are of interest. There are 23 dentists serving the clinic; fees were £2281 8*s.* 3*d.*, expenses £1080 11*s.*, and the amount for division among the dental staff £1233 0*s.* 8*d.* Other figures during 1920 were: patients' attendances, 4029; new patients, 1045; extractions, 4526; fillings, 818; dressings, 218; dentures 286; local anæsthetics, 436; major anæsthetics, 16; repairs, 88; scalings, 102; impressions and bites, 638. I am informed by the secretary that since the passing of the Dentists Act of 1921 the dental practitioners of the Bournemouth clinic are considering the advisability of adopting the panel system instead. If all the dental effort in a locality could be concentrated in one small area, such as a clinic, and mechanical work pooled on a coöperative basis among efficient mechanics working for several dentists, in well-equipped workshops supplied with up-to-date machinery, it would be very much better than it is now with the wasteful and inefficient methods adopted in many dental surgeries of to-day.

Dr. Sidney Barwise, county medical officer, Derbyshire, has suggested the employment of dental dressers, under the immediate supervision of qualified practitioners, for simpler forms of treatment, especially for school-children. Under proper safeguards, with a shortage of dentists and a desire to economise, such a system has much to recommend it—e.g., for dental schemes under public authorities or in such clinics as those mentioned above—but as a number of persons who are being admitted to the Register are incompetent to supervise or to teach such a system would be capable of very great abuses.

The association of dental and medical services presents important economic considerations. In the past, registered medical practitioners have been prohibited from coöperating with unregistered dentists in the practice of dentistry. Now, of course, medical practitioners may render assistance to

what were previously unregistered dentists who have become registered; this fact will enable general anæsthetics to be given more frequently than in the past. Most of the general anæsthetic work of unregistered dentists consisted in the administration of nitrous oxide "at arm's length"; they were afraid of giving too much, and as a rule they gave too little. In the Registrar-General's report for 1920 six deaths under anæsthetics are regarded as due to operations on the teeth and gums. Unregistered dentists made considerable use of local anæsthetics which in many cases caused a considerable amount of trouble owing to their lack of surgical cleanliness. It would be of great benefit to the public if some of the older and less skilful dentists would give up operative dentistry, and devote their attention entirely to mechanical work, a division of labour which exists to a considerable extent in Canada—the two branches of the profession there, operative and mechanical, being more or less separate.

Many of us would have liked to have seen the registered dental practitioner a surgical specialist, devoting his attention to one part of the body, but owing to the quality of a large number of persons admitted to the Register, this policy has not been followed; now that such specialised treatment as X ray examinations and the preparation of vaccines are becoming regularly recognised as part of dental treatment, the ordinary registered practitioners should be prepared to seek in consultation the assistance of other persons, dentists or doctors, who have had considerable experience in these branches of work, a combination of effort met with very little in the past. The necessity for this coöperation would increase the advantages to be derived from dental clinics.

The Government is now presenting a number of imperfectly educated dental practitioners with a monopoly value, the cost of which in future will be about £1000 a head. The public may reasonably expect a certain standard of efficiency on the part of the newly-registered, and it would be an advantage to follow the practice of the Central Midwives Board, who, after allowing midwives reasonable time to improve their methods, have removed from the registers the names of persons proved after complaint to be incompetent. The Government formerly only provided for the inspection of the work of public vaccinators and gave grants for the promotion of their efficiency if the work was well done. As in some cases exception has had to be taken to the performance of this very simple operation, it seems reasonable to expect that other work of both doctors and dentists should be supervised. Unskilful work by a dental practitioner may have very serious consequences indeed; work in which the State provides part of the cost of treatment should be supervised, and some system of local supervision should be instituted at once. Some one should be charged with the duty of making complaints to the Dental Board in suitable cases. Medical officers of health should be required to report any case of irregularity observed in their areas to the Dental Board, and should be protected in the discharge of their duty. The requirements of the 1918 Education Act should be enforced as soon as possible—i.e., that all education authorities shall provide proper dental service for their school-children, that this service should be available for children under 5 and for women coming under maternity and child welfare schemes, and that all approved societies shall take part in the work of the National Beneficent Society, or in some other way provide for dental service for all their insured members. This provision would at once include children and wage-earners, but would leave out a large number of single women, and married women who are not recent or prospective mothers, who should be provided for by a public dental service either on the lines of the clinics mentioned at Bournemouth, &c., or through the local authorities, on the analogy of water-supply or education service—i.e., because it is impossible for the majority of people to obtain it except in a proper coöperative basis. The cost of the services might be paid wholly or partially by the patients, except in cases of necessity, when similar measures could be adopted to those used for payment of the fees of doctors called in emergency by midwives. A useful preliminary to such a service would be to take the treatment of sick out of the Poor-law, hand it over to county and county borough councils, and thus provide in the area of these authorities an adequate institutional medical service which could include a public dental service. Bradford has provided a useful precedent; there the Poor-law hospital has been recently taken over by the city council, and supplies special treatment efficiently and at a no greater cost than when it was administered by boards of guardians under the disadvantages of association with other Poor-law work and without the advantage of a specialist staff.

In this short paper nothing has, of course, been said about dental research or recruiting new members for the dental profession, but the present is an opportune time to consider the importance of dental surgery and to regulate the work of dental practitioners. It was recently calculated that sickness costs this country about 150 millions per annum, but the Geddes Committee made no suggestion for effecting any economy to diminish expenditure of this vast sum. We cannot afford to waste money in this way in addition to perpetuating unnecessary suffering and death by failure to deal with questions of public health. It is suggested that the provision of a public dental service would effect appreciable economies in this direction and that the money spent on it would be a good investment.

CONDITIONS OF HEALTH IN THE BOOT AND SHOE TRADE.

THE boot and shoe trade forms one of the staple industries of the city of Norwich, and some interesting facts and suggestions as to the health of shoe operatives were brought out by Dr. F. W. Burton-Fanning in a lecture recently delivered to the Norwich Shoe Trade Managers' and Foremen's Provident Association. Dr. Burton-Fanning said that he had been invited to visit several factories and make any investigations he wished. He noticed a great improvement as regards buildings, hours, pay, and interest taken by employers in their employees since his previous visit some years ago, but there was still room for improvement.

Tuberculosis.

The only disease from which shoemakers suffered unduly as compared with the ordinary population was tuberculosis of the lungs, which was very prevalent amongst them. While 100 males of all occupations died from consumption, 145 shoemakers died of that malady; for 100 deaths of clergymen from the disease there were 456 deaths of shoemakers. The death-rate from pulmonary tuberculosis in one year per 1000 living persons was: Agriculturists 1·02, engineers 2·36, clerks 3·20, tailors 4·12, and shoemakers 4·41. Figures in Norwich confirm the story.

During the seven years in which sanatorium benefit was administered by the Norwich Health Insurance Committee, of 439 males applying for treatment 33·5 per cent. were occupied in boot factories, and of 297 women applying for treatment 20·2 per cent. were similarly occupied. Causes for this excessive incidence of consumption among shoe operatives had been, he said, suggested: (1) Poverty, with consequent bad housing and poor feeding; but agricultural labourers, who are far worse paid and often worse housed, suffer much less from consumption. (2) Excessive drinking; but the Registrar-General has shown that shoe operatives die from alcoholism to a less extent than the average population. (3) The odour from leather has been shown to have no particularly harmful effect on health, neither is the dust of boot factories possessed of any specially deleterious qualities; also, most factories are aware of the importance of avoiding dust and how to deal with it. (4) The cramped position of the shoemaker. Dr. Burton-Fanning did not think this less marked nowadays than formerly, or regard it as a contributory cause. But he believed that want of exercise played some part; it had been suggested that the more sedentary forms of work are associated with a higher consumptive death-rate, but probably the less robust members of the population were attracted to shoemaking because little muscular effort is demanded by the work.

Fatigue, nerve strain, and speed of work had a good deal to answer for, largely on account of the lack of fresh air in the factory rooms. Operatives who contracted tuberculosis were apparently distributed fairly evenly amongst all the factories of Norwich, and in Dr. Burton-Fanning's opinion its incidence was due, not to direct infection in the factories, but to the lowering of the operative's resistance to the growth of the organisms of the disease, implanted in him in childhood by the conditions of factory life. He thought that the want of fresh moving air was the most important cause of consumption in boot factories. The average age at death of all agricultural labourers who work in the open air was 66 years, and that of men employed in factories was 45 years.

For the boot factory operative who developed consumption there was the sanatorium, where the malady is usually checked by proper treatment, but experience showed only too plainly that the ex-sanatorium patient was not fitted to resume his place in the factory and keep pace with other workers at his old trade. For these men there was now a colony at Stanninghall, five miles from Norwich. This colony was started by Red Cross Funds for tuberculous soldiers, but civilians were now also admitted. To some extent outdoor occupations, such as market gardening and the tending of poultry and pigs, are followed, but it was found that the trade in which the man is already skilled provided him with the best living, and therefore industries were developed to allow colonists to resume their former employment. The prevalence of consumption in the boot and shoe industry had been the subject of a special investigation promoted by the Medical Research Committee, and it had been suggested that a boot and shoe factory should be started with ex-sanatorium operatives.

Lack of Fresh Air.

Coal-miners worked as a rule in well-ventilated shafts, using a great deal of muscular effort and clothing themselves lightly; whilst 70 per cent. of the miners who presented themselves for the army were graded in Class A, only 36 per cent. of industrial workers were so classed. Of all the workrooms in the factories which he had recently visited, he only found one room which wholly complied with requirements in the matter of fresh air. In this room there were only two workers, one of whom appreciated the virtues of fresh cool air, and had no opposition to contend with from others. The want of fresh air in all other rooms was immediately perceptible to the senses, and the striking contrast between the air of the workroom and that out of doors was a sufficient criterion. Observations were taken with Prof. Leonard Hill's kata-thermometer, and in only one room were the readings of the wet and dry bulb satisfactory in regard to the state of the atmosphere in which the men and women were working. In all the other rooms there was shown to a greater or less extent a want of cooling and evaporative power of the air. Thanks especially to the work and writings of Prof. Hill, it was now understood how stuffiness comes to be harmful and why fresh air possesses certain virtues. If the air was too still and too warm our vital processes concerned in heat production and the maintenance of bodily temperature were suppressed, with injurious effects on both our physical and mental welfare. Sweating had been described as "Nature's emergency mechanism for heat loss," and managers in factories should appreciate that to allow the air of workrooms to induce sweating in the workers, as he had found to be the case in several rooms on a winter's day, was to have their hands working under conditions of unnecessary and harmful strain. The free opening of properly arranged windows was the way to secure the right conditions for the workers—viz., cool and moving air. The temperature of the rooms should not be as low as 55° F., for it had been found that this degree of cold was associated with increased risks from accidents due to numbing of the hands. Short of this, the cooler the air the better for the workers, and on no account should a temperature of over 63° be approved of. The proper supply of fresh air by the opening of windows rests, Dr. Burton-Fanning said, with the prejudices of the workmen. Their objection was mainly due to ignorance, and to their rooted belief that cold is the cause of all ills. Even the infection of a wound was ascribed by ignorant people to cold; they failed to appreciate that germs disliked cold more than we did. Every effort should be made by the medical profession to convince workmen that their toil cost them less exhaustion in good air, and that the skin readily adapted itself to lower temperatures. Draughts were not to be recommended, but they did not occur in a properly ventilated room.

In conclusion, Dr. Burton-Fanning said that as such a large proportion of colonists from Norwich were expert operatives, he was most anxious to start a model factory for them, and suggested that such an enterprise might be grafted on to the existing colony at Stanninghall.

THE SALARIES OF WHOLE-TIME MEDICAL OFFICERS.

THE Southampton Borough Council recently sent an advertisement to the medical papers inviting applications for an appointment as whole-time school dentist at a salary of £450 rising to £540, and for the post of assistant medical officer at £450. *The Lancet* and the *British Medical Journal* both replied that they could not accept advertisements offering less than £500 per annum for either post. The Health Committee of the council thereupon recommended advertisement at that figure.

At the meeting of the borough council on Jan. 3rd, Mr. P. V. Bowyer asked what things were coming to. Was the council to be dictated to by newspapers as to what it was to pay its officials? It was intolerable. The two papers sought to say that £500 a year was to be the minimum a dentist was to receive the moment he left college. He was just qualified and no more, and had never pulled out a tooth for profit.

A voice: But he has for pain.

"You may talk about trade-unionism among workmen," added Mr. Bowyer, "but the trade-unionism among members of the medical profession is getting beyond anything."

Alderman Kimber said it was time the council ceased to allow other people to dictate to it. Were they going to be fooled about by *The Lancet*? He did not like the name of that paper. He moved an amendment that the positions be readvertised in non-medical papers at £450 a year.

Mr. H. M. Pugh (a solicitor) seconded. The council had, he said, decided on a 10 per cent. cut of wages and salaries, but the attitude of the Health Committee was that those who were protected should not have a reduction at all. It had been said that the borough electrical engineer was the only chief official of the corporation who was a trade-unionist, but the trade-unionism of the doctors was far stronger. Many a young solicitor would jump at an offer of £450 a year.

Mr. Silverman said he did not see why the council should be blackmailed by professional cliques.

The Mayor: I wouldn't say blackmailed.

Mr. Silverman: Well, I do say it.

A Labour member expressed surprise at Mr. Pugh's attitude. In another connexion Mr. Pugh would not take the same stand. They all knew what would happen if the Health Committee appointed a man in opposition to the views of the medical profession, and he doubted very much whether they would get applications from reliable men.

Dr. E. H. M. Stancomb said that the people who were opposing the minimum salary which the medical men thought right would not cavil at any price for saving themselves or any members of their families. The papers named had decided that for the preservation of the public and the dignity of the profession they would not take advertisements offering salaries below the minimum ones.

The council decided to advertise the unamended salaries in lay papers.

THE PROLAPSUPORT.

WE have received from Messrs. Allen and Hanburys, Ltd., 18, Wigmore-street, London, W., an ingeniously constructed uterine support which, it is claimed, may be inserted, adjusted, removed, and cleansed by the patient herself as often as may be necessary. It is made of rubber, mushroom-shaped, with a long stem the distal end of which is expanded into the form of a funnel. This funnel-like projection extends outside the vagina and its purpose is to protect a screw nut which, acting on a rod passing through the stem of the appliance, causes, on being turned, the supporting part of the pessary to assume the form either of a flattened sphere—the pessary proper—or a collapsed bulb thus facilitating insertion or removal. When inserted and adjusted it is said to make a suitable support for the uterus and to retain it well in position. The instrument is made in two sizes and the price is £1 5*s*.

A FRENCH MEDICAL DIRECTORY.

THE new edition of "Medicus" (Guide-Annuaire des Etudiants et des Praticiens." Paris: A. Rouzaud. 1923. Pp. 1563+xxxi.) is shorter by some 150 pages than its predecessor of 1922, but nothing has apparently been lost in the process of condensing this well-known medical annual. Part 1 of the volume is devoted to the organisation of the medical profession in France and to the facilities for and regulation of medical education in Paris. Part 2 deals with provincial faculties and schools of medicine, and Part 3 with foreign schools of medicine. Part 4 consists of a "Dictionnaire de droit et de jurisprudence médicale" for the use of medical men. Part 5 contains the laws and decrees relating to the practice of medicine and pharmacy in France, including those devoted particularly to tuberculosis, public health, industrial accidents, &c. Part 6 consists of a directory of the entire French medical profession, listed alphabetically and geographically, under four headings: Paris, Seine, Departments, and Colonies. It is announced that the usual supplements will be issued during the forthcoming year. An editorial note invites readers to point out errors in the text of "Medicus"; we may, therefore, state that the reference to this journal in the list on p. 412 should read as follows: *The Lancet*, 423, Strand, Londres, W.C. 2.

THE RELIEF OF DISTRESS.

"The Prevention and Relief of Distress" is the title of a handbook [1] of information relating to the statutory and voluntary means available for the relief of distress and the improvement of social conditions—a handbook which is in fact Sir Charles Loch's "How to Help Cases of Distress" rearranged, brought up to date, and re-issued by the Charity Organisation Society. The object of its publication is to place in the hands of the social worker or student such detailed information under various headings as ought to be possessed by persons who undertake the responsibility of relief administration. The handbook, therefore, describes the principles which underlie such administration, and the methods shown by experience to be sound. Although written from the standpoint of the London worker, its contents will be of great use to workers elsewhere. The chapter headings sufficiently indicate the range of subjects; they are as follows: The Framework of Local Government in London; Poor-law Administration; Principles and Methods of Charity; Distress Due to Sickness; Distress Due to Mental or Physical Disability; Distress Among Persons of Particular Age, Class, or Condition; Unemployment; Distress Arising out of the War; Special Classes not included in the foregoing list; Rescue Work; and Endowed Charities.

[1] London: P. S. King and Son, Ltd., and the Charity Organisation Society. Pp. 140. 2*s*. 6*d*.

COLONIAL HEALTH REPORTS.

Straits Settlements.—In his report for 1921 Mr. F. M. Baddeley, acting Colonial Secretary, states that the population, as enumerated at the Census on April 24th, comprised 557,838 males and 324,101 females—total 881,939, distributed amongst the Settlements as follows: Singapore, 417,859; Penang, 304,572; Malacca, 153,599; Labuan, 5909. The total was made up of 8045 Europeans and Americans, 9015 Eurasians, 254,843 Malays, 497,406 Chinese, 104,498 Indians, and 8132 other nationalities. The Chinese population had increased, since the previous Census, 34·9 per cent.—the males by 24 per cent. and the females by 65·2 per cent.; the increase in Chinese females was the outstanding feature of the Census. The crude birth-rate in 1921 was 32·57 per 1000, the percentage of males born being 52 to 48 females. The crude death-rate was 31·79 per 1000. Deaths from pneumonia numbered 1702, from influenza 262, from beri-beri 1272, from malarial fever 4707, from tuberculosis 3292, from dysentery 1081, and from diarrhœa 359. Dangerous infectious diseases notified in the colony did not play a large part in the mortality. There were 62 deaths from cerebro-spinal fever, 28 from plague, 2 from cholera, and 47 from small-pox. All but 6 of the deaths from small-pox occurred in Singapore, where the disease was prevalent from May until the end of the year, the total of cases there being 147.

Bermuda.—The total population, according to the Census held in April, 1921, was 22,505, including the naval and military establishments (1536) and the hotel floating population (842); the white population numbered 7006 and the coloured 13,121. The birth-rate in 1921 was 31·2 per 1000 (25·7 white and 34·2 coloured). The death-rate was 18·37 per 1000 (15·55 white and 19·46 coloured). Illegitimate births were 14·6 per cent. (7·1 white and 13·5 coloured) of the total. The Public Health Act, 1920, was put into force on March 1st, 1921, when Dr. Eugene Walker assumed duties as medical officer of health. This Act, taken in conjunction with the Pest Destruction Act, 1921, sets up all the machinery necessary for the more scientific and efficient handling of the many sanitary and cognate problems connected with the preservation of the public health, which, speaking generally, continued to be excellent in 1921. There are no tropical diseases other than an occasional mild type of fever diagnosed as dengue. Malarial fever is unknown. During the summer months there was a sporadic but mild type of typhoid fever, 54 cases in all resulting in three deaths. There was also a somewhat severe epidemic of measles and whooping-cough during the year. There were 28 deaths from tuberculosis—six less than in 1920. The great majority of houses have a good water-supply, each house having its own rain-water cistern, and typhoid infection is therefore rarely spread through an infected water-supply. The most serious sources of infection are from flies, and the inadequate sanitary conveniences available in many of the poorer dwellings. A start has been made with the campaign against mosquitoes. The equable nature of the climate generally is most agreeable, and is no doubt mainly responsible for the satisfactory state of the public health. In 1921 the mean temperature was 67·5° F. in January and April, 77·9° in July, and 70·9° in November. The total rainfall was 54·43 inches. About 17,000 tourists are estimated to have visited the colony during 1921. These figures really cover part of two seasons, as the "season" runs from November in one calendar year to the end of April or May in the next. Summer travel seems likely to increase largely in the near future.

DIETETIC HINTS.

MOST writers on food advocate a return to a more natural diet, but fail to tell us why nature has provided us with an appetite beyond our needs; thus their claim that we all eat far too much falls rather out of line with their general argument. A recent volume entitled Diet for Women,[1] by Dr. Cecil Webb-Johnson, contains sense and not, we think, nonsense. The author condemns milk as a food; but the argument that cow's milk was not intended for human consumption, and that the composition of a calf's body is different from an infant's, is illogical, and might be applied to any article of diet other than human flesh or human milk. The author gives some useful help in the choice of foods, and in discussing alcohol and tobacco. From the standpoint of accuracy the book has lapses A writer who refers to the greatest name in medicine as "John" Harvey, states baldly that it is generally agreed that both physiologically and anatomically man is intended by nature to be a fruit-eating animal, and that the pulse-rate is ten beats per minute faster in meat-eaters than in vegetarians does not command our confidence; but this is no reason why his manual should not be interesting and witty, and it is both.

[1] Diet for Women. By Cecil Webb-Johnson, M.B., Ch.B., late Civil Surgeon and Officer Commanding Station Hospital, Dum-Dum, &c. London: Mills and Boon. 1922. Pp. 176. 5*s*.

SURGICAL INSTRUMENTS: A CHANGE OF ADDRESS.

WE are informed that the well-known surgical instrument business of Arnold and Sons, of 6, Giltspur-street, London, E.C., recently acquired by Messrs. John Bell and Croyden, Ltd., has been transferred to new premises adjoining the latter's pharmacy at 50 and 52, Wigmore-street, W. A repair department is now open; an emergency cabinet from which instruments may be borrowed, and a large dispensing department, are both accessible to members of the medical profession at all hours of the day and night.

ANILINE PENCIL IN A BUN.

To the Editor of THE LANCET.

SIR,—Your reference to a case of tissue-necrosis caused by a coloured pencil, reported by Dr. E. Glass, of Hamburg, strikes a timely note of warning when aniline pencils are in such common use. About 15 years ago a man called upon me in a terribly excited state, his tongue protruding and purple saliva dribbling from his mouth. After his mouth had been thoroughly washed out I was told that when eating a bath-bun he had recently bought he felt a gritty substance between his teeth which he speedily ejected. He was, however, alarmed at the deep purple colour, not only of the matter ejected, but also of the deep staining of the mouth and lips. As the patient seemed to be none the worse except for the staining I dismissed him and advised him to see his doctor if any symptom arose. I think there can be no doubt that a piece of an aniline pencil had accidentally got into the bun.

I am, Sir, yours faithfully,
CHARLES W. CHAPMAN.

Harley-street, W., Jan. 2nd, 1923.

THE CHAULMOOGRA PLANT IN LEPROSY: AN ANCIENT REMEDY.

To the Editor of THE LANCET.

SIR,—An ancient story current in India credits the Chaulmoogra plant with being one of the oldest known remedies in the treatment of leprosy. This legend is at the moment rather absorbing, connecting a fragment of the early history of medicine in India with the most up-to-date medical research. Rama, a king of Benares, was afflicted with leprosy, relinquished his throne in favour of his son, and disappeared into the jungle, in which he lived on roots and herbs, and especially on the leaves of the kalaw tree; he eventually recovered completely. One day he accidentally met the Princess Piya in the jungle; she had been banished from the kingdom of her father; also on account of suffering from leprosy. Rama effected her cure by feeding her on the fruit, root, and leaves of the kalaw tree, married her, and erected a new city in the place where these trees grew. The lady by way of showing her gratitude presented the devoted Rama with twin sons on 16 occasions—so the story goes.

Chaulmoogra oil is obtained from the kalaw tree, and it has been in use in India for centuries as a remedy for leprosy and several skin diseases. To-day, thanks to the work of Sir Leonard Rogers, the ethyl asters of the acids from chaulmoogra oil are yielding results far more satisfactory in the treatment of leprosy than any remedy hitherto employed in that disease. These asters are being used in the eight leper asylums in the Province of Bihar and Orissa, which in 1921 contained 1967 resident lepers; the reports on this treatment in these institutions are most encouraging.

I am, Sir, yours faithfully,
P. HEHIR,
Westward Ho! Dec. 26th, 1922. Major-General, I.M.S. (ret.).

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